THE MEDICAL JOURNAL OF AUSTRALIA

VOL. II.—22ND YEAR. SYDNEY, SATURDAY, NOVEMBER 16, 1935. No. 20.

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The Charles MacKay Lecture.

A GLIMPSE AT THE HISTORY OF THERAPEUTICS.[1]

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THE Charles MacKay Lecture—one of the five official addresses of this great institute—deals with the "History of Medicine and the History of Mankind". It was founded by Miss C. MacKenzie with a gift to the national government of Australia to honour the memory of her grandfather, Mr. Charles MacKay, a well known educationist of the early fifties of last century in the State of Victoria. A glance at the title of this lecture for 1935 indicates my choice of a subject.

[1] Delivered at the Australian Institute of Anatomy, Canberra, on September 7, 1935.

The word "therapeutics" comes from the Greek θεραπεύειν, which means "to care for", and when we care for a sick man we do not treat the disease directly, except in a few instances, but help him while he struggles against his enemy. This help means far more than the giving of drugs, but includes every physical, psychic, nutritive and other factor which may assist him in his efforts towards health. It is not uncommon that the practitioner best aids the sufferer by stopping the administration of all drugs with which the patient may have been unwittingly thwarting Nature in her efforts to restore him.

The therapeutist may be likened to a guide trying to lead his party, the patient, to the goal called health. Sometimes the road is broad and clear, having been surveyed and mapped out by previous explorers and scientists, and the guide goes confidently ahead. But it may be that the country is difficult—one into which science has scarcely penetrated and where there are no blazed trails. What is

he to do? Give up his guideship and abandon his party to its fate? No, by no means no! But if he does, perhaps some native may glide out of the bush and, taking the patient by the hand, may lead him by pathways that are on no map and may so save him. Such paths are empirical. They have not been shown by scientists to lead correctly, and yet they often do so. Many of our best drugs have been discovered empirically. They have gradually been studied and improved in many ways, but we must always remember that they were there and used by ignorant natives long before they got into the pharmacopœias.

The history and evolution of treatment form a most interesting chapter of medicine. In this short attempt at looking backwards I will not weary my listeners by naming the outstanding men who through the centuries have added this or that to the edifice of our knowledge of disease; or the different periods in the advance of our art. Many histories covering these items have been written and are most useful for reference; but a mere list, such as I should only have time to give, would be as uninteresting as were the names and dates of the kings and queens of England which used to haunt us in our school days. Rather I shall attempt to show in a general way how through the ages and under the most varied forms of therapy diseased persons tended to recover; in other words, to emphasize the overwhelming importance of the *vis medicatrix naturæ*.

All living creatures have a therapy and have many simple remedies which instinct has taught them to use. One cannot watch a dog, which has eaten something which disagrees with him, select a certain grass as an emetic without realizing this. In the same way the most primitive peoples found out many things which have since proved to be of the greatest value in the conditions for which they took them. Thus were discovered opium, cinchona, ipecacuanha and, indeed, most of our vegetable drugs. Instinct, or the silent call of the tissues, has taught animals what is best to eat. Put a dog, a horse and a fowl into an enclosure in which are a number of different foods. Will they all eat the same foods, and to the same extent? No. Each, under the direction of instinct, will pick out the right amount of what suits him best.

> Who taught the nations of the field and wood
> To shun their poison and to choose their food?

If we add man, a human animal, to the party, will he alone err and perhaps poison himself with what Nature never intended him to eat? He may err sometimes, having, under his artificial surroundings, acquired certain bad habits; but, generally speaking, it is likely that man, in spite of his follies and excesses, has still an instinct which leads him to take what, on the whole, is best for him. His instinct is not entirely submerged by civilization, and his tissues will call with a voice that he calls appetite for what they need for their obscure metabolic processes.

In recent years the value of the different vitamins has been discovered, and the fact that their absence produces various diseases. Thus a deficiency of vitamin *D* causes rickets. In a recent experiment at the Guelph Agricultural College, a number of chickens, confined in a large pen, were supplied with dishes of various foods, including two of a mash, one of which contained cod liver oil and the other only mash. Cod liver oil is rich in vitamin *D*. Now that necessary vitamin can be supplied either thus in food or by the action of the ultra-violet rays of sunshine, which change the ergosterol in the skin into this substance. It was found that on dull days the chickens all went for the cod liver oil mash, but on sunny days they preferred the other. Here the silent call of their tissues asked for the necessary vitamin.

Animals having no imagination have kept on in the same way as did their forbears, but man, being so gifted, began to theorize about the causation of disease, and then how to treat it. Now theories are necessary to progress; but they are tricky mounts and are apt to run away with their riders and land them in all sorts of trouble. History, although showing a gradual and uneven advance, is full of such catastrophes; and man has suffered much from many of the systems of treatment founded on theories that have later been shown to be fallacious. Fortunately, theories are very often, so to speak, only skin deep, and a sort of instinct, call it what we may, seems usually to guide men aright. For example, the natives of South America had a theory that fever and ague were due to an evil spirit and that cinchona drove it away. The theory that the disease was of supernatural origin was wrong, but the practice of giving cinchona was right. Iron was used from very early times as a scarer of the spirit of anæmia, and the results were excellent. It will be found that nearly all theories have a germ of truth in them, and it should be our aim to find that germ and to discard the thick husk of exaggeration, nonsense and even fraud which clog the systems of treatment founded on them. Some of these theories and the systems of therapy founded on them will now be mentioned.

Astrology.

The relation of astronomy to therapeutics dates from very early times and was specially important in the dark ages. Hippocrates himself said: "Astronomy is not of slight but of very essential importance in medical art." According to the Babylonian code of Hammurabi (2200 B.C), a surgeon who operated when the stars were not propitious should have his hands cut off. It seems that all nations have at some time shown their belief in astronomy as affecting disease and its treatment, and it is hard to believe that such a widespread opinion can have no foundation in fact. With astronomy of such importance, almanacs and calendars were of the greatest moment, and no medicine could be taken nor operation performed without the sufferer's horoscope having first been

cast and found to be favourable. We see traces of such belief today when people hesitate to start an enterprise upon a Friday, especially if that Friday happens to be the thirteenth day of the month.

Supernatural Origin of Disease.

The theory that disease was of supernatural origin was probably the earliest of all, and the priests were the first practitioners. Disease was believed to be due either to the demon's entering the body or to his causing it from a distance. By the way, most of the disease demons were female. With the object of driving or tempting the evil spirit out of the sufferer, exorcism was practised. Various methods were used, such as the beating of drums, the beating of the patient himself, and a host of other scaring processes. Some examples I cull from my own experience in India. Has Baboo Hemneryhain, the respected clerk of the local law court, the jaundice, or do his ageing joints pain him when he rises in the cold December mornings, it will never occur to him to consult the English doctor sahib, nor to go to the government hospital for treatment. "No, he is not ill enough for that", say his friends; and so the wise woman of the village is sent for, and she, with much muttering and mysticism, will compound a potion or will make up some charm for the special trouble complained of. If the patient's condition improves, then she gets the credit (and may deserve it); if it does not do so, she will explain that the spirit is angry, and a priest will probably be called in. He does not believe in drugs as a rule, although he occasionally uses them as spirit-scarers. His powers lie chiefly in incantations and charms, and for a small pecuniary consideration he will exercise them and, either by tempting or driving the spirit of the disease out, will try to cure the patient. But perhaps, in spite of all this treatment, the old man gets worse. He is yellower; the rotund figure, which in the East lends so much dignity to the owner, dwindles, and his ribs show through the sagging skin. His European superiors at court remark upon his altered appearance and persuade him at last to see the doctor sahib, who probably recognizes the case as one of cancer and, as such, hopeless. "It is kismet", say his friends; "the spirit will not leave him", say the priests; and they may add that as long as they attended him he lived, but when the doctor sahib took charge he died. It will be understood that the European doctors have a high mortality rate in their native practice.

When cholera rages in an Indian village a dreadful hubbub is kept up by the inhabitants as they try to scare the goddess of cholera away. But in the neighbouring villages the people are alive to the danger and by lighting fires (which was done in London, by the way, in 1665) and, if possible, by making more noise than in the infected village, they hope to dissuade the spirit from coming to them. Naturally, if the villagers of one hamlet are doing their best to frighten the spirit from out of their domain, and those of the other are trying to prevent it from crossing the boundary, ill-feeling is apt to arise between the villagers, and such has often been the cause of serious feuds.

As epidemics were supposed to be due to spirits, it was quite certain that eye-witness evidence would be forthcoming. When many years ago the plague was raging terribly in Bombay, both Hindus and Mohammedans believed it to be due to a hostile spirit, a goddess; and, as one might have expected, a witness soon appeared in the form of an old Mohammedan woman, whose eyes had been cleared by a visit to the sacred city of Mecca. This old lady swore that she saw the plague goddess, in the form of a gaunt female, with bloody fangs and fleshless, sinewy arms, sheeted in white, stalking through the streets of the city. Similarly, during an outbreak of smallpox in Calcutta in 1897, it was believed that the goddess Sitala (the deity presiding over smallpox) was seen at dead of night, this time by a native policeman. In consequence the people flocked to the shrine of the goddess and offered prayers and gifts. The epidemic just then began to decline (owing, doubtless, to the excellent work of the health department) and the people, of course, thought that the goddess had been appeased. The policeman, by the way, said that he had boldly gone up to the spirit and had been about to lay hands upon her when he was prevented by an unseen agency—probably the goddess of fear! The irate spirit, however, pronounced sentence of death upon him for the same hour next night and then vanished. Sure enough, he expired on the following night after telling his story. Of course, we should say that he died of fright.

With such a fallacious groundwork as regards the ætiology of disease, the common people of India have nevertheless gradually evolved many very wise hygienic rules. Thus they believe that when a man has smallpox it angers the goddess if his friends go near him, and also if they travel abroad. Now, evidently, the united observation of many people through centuries had noted that when persons went near such a patient they were apt to get the disease themselves; and when, having been near him, they travelled elsewhere, the infection might spread in their wake. They thus had established a system of quarantine.

The idea of the transference of disease has always been common, as when the legions of devils passed into the Gadarene swine. Marcellus (A.D. 300) tells us that for gripes a live duck was applied to the abdomen and the pain passed away from the patient into the duck, where it proved fatal. A few years ago a Dr. Rorie saw a case in which a nursemaid, suffering from *impetigo contagiosa*, had deliberately infected a child with it, with the object of herself getting rid of the disease (*The British Medical Journal*, June, 1904). The scapegoat idea is similar to this.

Charms and talismans of various sorts were largely used in many countries.

This magic treatment was believed to be especially efficacious if exorcisms had been written or engraved upon paper, gold, precious stones *et cetera*, in which case they were suspended around the neck of the patient.

The rope of the hung criminal plays a conspicuous part in antique magic. Peoples, religions, philosophical systems, political revolutions, have risen and fallen, but the belief in the curative action of the rope has survived. (Magnus.)

Many charms survive to the present day. Who has not seen the most educated carry a potato in the pocket to ward off rheumatism? An iron ring is also much worn. Special groupings of numbers and circles were much used as talismans. I once found such a one under the pillow of a dying lady in India. Her faithful ayah had put it there in the vain hope that it would help her mistress.

Temple sleep and, later, church sleep as curative methods were of very ancient origin. Here the patient would enter the sacred edifice and, after certain purifying processes, would stay there for varying periods—weeks, months and even years—always with the hope that the evil spirit would dislike the environment and would depart. Many historical cases of cure are on record. Thus a certain man, deaf, dumb and blind, known by the name of Amagildus, tried the sleep in the Church of Saint Julian at Brioude. He had to stay there for a year before the curative power of the holy martyr delivered him from his ailments. Veranus, the slave of one of the clergy under Gregory, was so violently attacked by gout that he was absolutely unable to move for an entire year. Thereupon his master pledged himself to advance the afflicted slave to the priesthood if Saint Martin would be willing to cure him. The poor wretch was carried to the church and there placed at the feet of the saint. Finally, on the sixth day he was visited by a man who seized his foot and drew it out straight. The slave rose in terror and perceived that he was cured. Here human effort entered into the treatment; and it often happened that patients were even cut for stone while in the sacred edifice, always, as they believed, by the special saint himself.

It is interesting to note that the oldest hospital in London commenced in this way. The ancient church, which still stands, was used by the Londoners for church sleep; but they did not all get better, and so a hospital, Saint Bartholomew's, was founded near it by Rahere, in A.D. 1123, to look after them. Church sleep lingered in England at Christ Church, Monmouth, until 1804. Even at the present day it is still carried on in the churches of southern Italy and the Grecian islands.

Now there is no doubt that many of these fantastic methods of treatment were successful. The superior twentieth century observer will say that this was either because valuable drugs had been hit upon under some wrong theory or because of the uplifting effect of hope and faith or, lastly, because of the action of the doctor's best friend, the *vis medicatrix naturæ*. As regards hope and faith, you may remember how that neurotic French author exclaimed: "What doctor possesses such curative resources as are latent in a spark of happiness or a single ray of hope?" The old lady in *Punch* was an example of this when she exclaimed as she handed the thermometer back: "Ah, doctor, that did me a deal of good." To quote from Paracelsus: "Whether the object of your faith is real or false, you will nevertheless obtain the same effects. Faith produces miracles."

In psychotherapy three elements are necessary, which were well described by Sir William Osler:

First, a strong personality, in whom the individual has faith—Christ, Æsculapius (in the days of Greece), one of the saints or, what has served the turn of common humanity very well, a physician. Secondly, certain accessories—a shrine, a sanctuary, the services of a temple, or for us a hospital or its equivalent, with a skilled nurse. Thirdly, suggestion, either the "only believe", "feel it", "will it" attitude of mind, which is the essence of every cult and creed, or the active belief in the assurance of the physician that the precious boon of health is within reach.

The Humoral Theory.

The humoral theory was a very ancient one, dating from Babylonian times. Hippocrates elaborated it and taught that there were four humours—blood, phlegm, yellow bile and black bile—which were later the explanation of the sanguine, phlegmatic, choleric and melancholic temperaments. Disease was due to a disturbance of the equilibrium between these humours. This theory, like the later Brunonian one, led in time, and after the temperate influence of Hippocrates had gone, to excessive bleeding, purgation, salivation and the use of diuretics, all with the idea of getting rid of an excess of some humour. It is interesting to note (I quote from Rolleston's recent article in *The British Medical Journal*) that as late as 1842 Ayres described as humoral diseases syphilis, cancer, melanosis, scrofula and inflammation.

The Iatro-Chemical Theory.

The iatro-chemical theory of the causation of disease was first propounded by that great but revolutionary physician, Paracelsus (1493-1541). He was the man who publicly burned the works of Hippocrates and Galen and substituted chemistry for the humours. He and his followers agreed that acids and alkalis were responsible for disease, and thus was born the great subject of biochemistry. By the way, "the word 'chemistry' was derived from Chema, the ancient name of Egypt, the Black Land. Hence chemistry was called the Black Art". I quote from Bernard Dawson's excellent little book on "The History of Medicine".

Solidism.

The theory of solidism was a very old one. According to it, disease was caused by organic changes in the different organs of the body. Themison was its chief exponent a century before Christ. Ailments were due to constriction or relaxation of the pores, between the atoms of which the body and its fluids, or parts of them, were thought to be composed. Many workers through the centuries have added to the sum of knowledge of organic changes in the organs. Even so late as our early days these physical alterations in the tissues were considered to be a sufficient explanation of disease.

Lately, however, the chemical and humoral views are coming into their own again, in, of course, a very modified form.

Sthenic or Asthenic.

In the eighteenth century, John Brown, cutting adrift from the teaching of Cullen, who had upheld the solidism theory very strongly, started the idea that all disease was either sthenic or asthenic, and with it the view that the patient's condition must either be lowered or raised. The sthenic patient was treated by venesection, purging, starvation, sweating and other depletory methods; the asthenic was given alcohol and various stimulants. The stimulating theory probably did little harm, but that cannot be said of the depletion theory, which reached its climax at the end of the eighteenth and the beginning of the nineteenth century. It was said of Broussais, a French physician, that he shed more blood than did Napoleon. Then a reaction set in, and in opposition to the starvation therapy Graves asked that the epitaph on his tombstone should be: "He fed fevers."

Lettssom, the founder of the Medical Society of London, evidently belonged to the Brunonian school, for an enemy wrote the following skit:

> When folks is sick they come to me,
> I physics, bleeds and sweats 'em,
> Sometimes they live, sometimes they die,
> But what cares I,
>
> I. Lettssom.

As a matter of fact, his initial was "J", but one must allow for poetic licence.

In 1842 Oliver Wendel Holmes wrote:

I firmly believe that if the whole materia medica, as now used, could be sunk to the bottom of the sea it would be all the better for mankind, and all the worse for the fishes.

We must remember, as Rolleston says, that Holmes was a mere anatomist.

Homœopathy.

Much earlier than Holmes, in the end of the eighteenth century, Hahnemann published his work, "The Organon of Medicine, VII". Hahnemann was an ordinary medical practitioner in Germany. He became dissatisfied with the current treatment founded on the Brunonian theory. He wrote:

The old school presupposes the existence of excess of blood (plethora, which is never present), sometimes of morbid matters and acridities, hence it taps off the life's blood and exerts itself either to clear away the imaginary morbid matter, or conducts it elsewhere by emetics, purgatives, sialagogues, diaphoretics, diuretics, drawing plasters, setons, issues *et cetera*, in the vain belief that the disease will thereby be weakened and substantially eradicated; in face of which the patient's sufferings are thereby increased, and by such rather painful appliances the forces and nutritive juices, indispensable to the curative processes, are abstracted from the organism. It assails the body with large doses of medicines, often repeated in rapid succession for a long time, whose long-enduring and often frightful effects it knows not, and which it, purposely it would often seem, makes unrecognizable by the co-mingling of several such unknown substances in one prescription, and by their long-continued employment of it develops in the body new and often ineradicable diseases.

And a little later:

It is under the old physician who has been at last gradually convinced of the mischievous nature of the so-called art after many years of misdeeds, and who only continues to treat the severest diseases with strawberry syrup mixed with plantain water (*i.e.*, nothing) that the smallest number are injured and die.

Having thus condemned the prevailing medical practice, he propounded the theory of like curing like. The doctrine was not a new one, but a revival of that of Paracelsus, who was a believer in the curative powers of the spiritual entities present in the body. Hahnemann thought the effects were due to drugs, which, strange to say, were more powerful the smaller the dose. The two elements in his therapy were: (i) A drug would cure a disease which resembled the effects that the drug itself could produce. Thus belladonna occasionally causes a scarlatina-like rash and, therefore, was to be used in scarlatina; ipecacuanha causes nausea and vomiting and hence would relieve such symptoms *et cetera*. (ii) The power of a drug increased as the dose was lessened. Hahnemann was able to try his treatment in hospital, and it soon became evident that his results were better than in the regular hospitals, and so the cult grew.

Hahnemann just missed being a great discoverer, for his work showed (although he never admitted it) that patients tended to recover without any drugs. In fact, he rediscovered the powers of the *vis medicatrix naturæ*.

The healing power of nature was a Hippocratic doctrine. Not that Hippocrates taught, as he was afterwards reproached with teaching, that nature is sufficient for the cure of disease, for he held strongly to the efficacy of art. But he recognized, at least in acute diseases, a natural process which the humours went through—being first "crude", then passing through "coction" or digestion, and finally being expelled by resolution or "crisis" through one of the natural channels of the body. The duty of the physician was to foresee these changes and to assist or not to hinder them; so that the sick man might conquer the disease with the help of the physician. (*Encyclopædia Britannica*, Volume XV, page 800.)

But, alas, this tendency towards health seemed to have been completely forgotten and was only again brought to light by accident, so to speak, by the results of Hahnemann's masterly inactivity. But Hahnemann did not see this, for he wrote:

Nature is a bad physician and not to be trusted; drugs are the real curative agents, provided by the beneficence of the Almighty. (*Encyclopædia Britannica*, Volume XII, page 128.)

Endocrinology.

From the dawn of history we find evidence of the belief of man in the power of the tissues of the various organs of the body to produce effects when taken internally. Thus men would eat of the heart of the lion or of a captured enemy in the belief that it would make them brave; of the brain to make them clever; and so on. The conception that the organs produced substances which, carried elsewhere in the blood, caused certain effects was first promulgated by the famous physiologist, Claude Bernard, in 1855, and the idea was received with

such scepticism at the time that it nearly ruined his reputation. But truth will out, and the therapeutic use of extracts from the internal organs, first started by Murray in 1891 in the treatment of thyreoid insufficiency, soon spread until nearly every organ in the body was attacked and extracts made therefrom and given in all manner of supposed deficiency diseases. There seems no doubt that the pendulum swung too far, but the fact that certain organs secrete internal secretions, hormones, that influence the activity of other organs, stands out as a proved fact. The pendulum, as I say, has swung too far and even threatens to become a commercial menace, but the value of thyreoid extract, suprarenal extract, insulin and pituitrin is beyond cavil, and several others might safely be added to the list. Pernicious anæmia is perhaps the latest addition to the number of so-called deficiency diseases, and the outlook of sufferers from this formerly inevitably fatal complaint has been completely altered by the use of liver and other extracts which contain the missing hormone.

Infection.

When bacteriology was brought into being by the work of Pasteur and Koch over fifty years ago the importance of microorganisms as a cause of disease became evident and for long overshadowed that of the soil. Infection was everything and the body was its defenceless prey. But gradually it was realized that the living organism had great natural powers of defence, either inherent or acquired, and as a consequence the establishment of immunity rather than a direct attack upon the invading organisms, became the chief object of the medical practitioner. Drugs were here of less value than vaccines and sera, although certain of them, such as quinine in malaria, and emetin in amœbic dysentery, more or less attacked the invaders or their toxins.

Inoculation for smallpox, and later vaccination, established by Jenner in 1796, are examples of the induction of immunity. Vaccination was used in India over three thousand years ago. It is on record that Dhanwantari, a Hindu physician, who lived about 1500 B.C., described it and even the method of obtaining the lymph from the cow's udder.

Lately focal infection has been much in evidence and in some places has probably been given too much limelight. It is not new. Benjamin Rush in 1803 wrote on the subject and gave a number of examples of the benefit derived from the extraction of teeth and of the disappearance of symptoms due to "acrid and putrid matters sometimes discharged from the teeth" (Rolleston).

The introduction by Lister of antiseptics and later of asepsis was a fatal blow to wound infection and altered the whole subject of surgery; but with this, as a therapeutist, I will not deal, nor with the discovery of general and local anæsthesia, which have made operation and child-bearing painless. Perhaps antiseptics and anæsthesia have made operations too safe and easy, and there may be a fly in the ointment; but this is for the surgeons to consider.

Drugs.

It is instructive to note the fluctuations in the use of drugs, as shown in history. At one time they are used to excess, at another they are almost ignored. Even the best have had their ups and downs. For example, digitalis was in the "London Pharmacopœia" of 1665 and several subsequent editions and was then dropped for over a hundred years. Then Withering heard of its virtues in dropsical conditions from an old wise woman and replaced it on its now firm pedestal. Iodine has also shown the changes in fashion. The Greeks used to administer the ashes of seaweed in the treatment of goitre. Pure empiricism to be sure, but they got results. A century ago scientific medicine no longer acknowledged the value of the ashes, but held in high esteem the chemical, iodine. In a small treatise written in 1824 a Dr. Gairdner, of London, urged the treatment of goitre with iodine. "Yet", says a writer in a recent *Spectator*, "until the other day we of the present century had forgotten iodine in its most valuable uses, and thought of it merely as an excellent local antiseptic or agent for local painting over some local inflammation."

A study of the history of medicine reveals that many discoveries are really rediscoveries. J. K. Fowler very truly wrote: "If you want to be original you must not read too much."

In this short and very incomplete glance at the history of treatment I have repeatedly referred to the healing power of Nature—to the *vis medicatrix naturæ*—but lest we should rely too much on this, it must be remembered that Nature is neutral and would as lief that a man die as that he should survive. When a cancer becomes implanted in the tissues Nature encourages the growth, and nothing but the surgeon's active interference will save the patient. In the same way, it is in accordance with Nature's laws that a tapeworm flourishes in the intestine or the *Acarus scabiei* in the skin. Both will continue indefinitely unless they be treated medicinally.

Nature may be compared with an absolutely unbiased judge who dispenses the laws and exacts the penalties. And the laws are not man-made, but come from her. A man poisons himself with alcohol and the court decides that he shall suffer and perhaps die. Another shuts himself up in a bad atmosphere, and there, burning the midnight oil, wears himself out working—perhaps in order that his loved ones may live. But the verdict is that the tubercle bacillus, which, following natural laws, has implanted itself in his depressed tissues, shall win. The court is indeed one in which the natural laws are fairly administered, but where sympathy and pity are unknown.

It would be wrong for us to consider that the therapeutic edifice is near completion. Our views of the present are but bricks in the building, some no doubt bad bricks that will be rejected by our

successors, and some good which will be retained and will form part of the great structure that is slowly and by successive layers advancing to the level of, not perfection—that would be too much to hope for—but of improvement; so that man in his pilgrimage through life may be helped to live longer and to live more healthily than did his ancestors.

AN HISTORICAL SURVEY OF THE PROGRESS OF MEDICINE IN RELATION TO CARDIO-VASCULAR DISEASE.[1]

By ERIC F. GARTRELL, M.B., B.S., M.R.C.P.,
From the Electrocardiographic Department of the Adelaide Hospital.

WHEN your Honorary Secretary, with the air of one asking a favour, afforded me the opportunity of presenting a paper to this section, I accepted it with pleasure. However, after collecting my data, I found I had undertaken a task of far greater complexity than I had anticipated. What exercised my mind most was not the process of gathering items of interest, but that of arranging them and determining the stress to be laid on each.

I do not profess to have allotted space to different items in proportion to their strict scientific or historic value; but rather have I endeavoured to render interesting some facts not familiar to all of us, possibly to the exclusion of some that are of more intrinsic value and therefore not unknown to many here tonight.

Necessarily, in surveying so extensive a subject as cardio-vascular disease in so short a space of time, I must plead guilty to many shortcomings and omissions, but I trust that you may be in some measure recompensed for this by the inclusion of sundry passages which, though not strictly relevant, tend to render our study more interesting by throwing light on subjects from fresh angles.

From 460 to 370 B.C. Hippocrates made a close study of people suffering from various complaints, in consequence of which he is revered as the founder of our art. As an outcome of his work he left an important legacy to cardiologists in particular, in that he ascribed the utmost importance to what the modern physician still conceives to be one of the most essential factors in investigating any cardiac condition, that is, a comprehensive case history. New diagnostic methods have from time to time tended to obscure this fundamental fact from view; but let us not forget that its value has not decreased with the advent of the mechanical age, but rather has it been enhanced owing to our ability to associate symptoms with known pathological conditions.

Galen (A.D. 131-201) was born in Pergamus, in Asia Minor, where he had considerable surgical experience as physician to the gladiators for a period of four years. In treating their wounds he had ample opportunity for observing blood vessels, and in consequence his writings record the fact that the arteries contain blood. This prompted him to conduct experiments on the heart and blood vessels, in the course of which he found that the proximal part of a ligated artery pulsated in response to the heart's contraction. By observing the pulsation of an excised heart, he might be said to have sown the seeds of Gaskell's myogenic theory.

Not only did he conduct experiments, but he also took note of all things connected with his patients, and made deductions therefrom; hence his right to the title of the spiritual ancestor of the modern physician. In reference to this there is the story of the physician who berated his patient for eating horse flesh. Subsequently his assistant, on inquiring how he knew that the patient had done this, received the reply that he had seen the harness under the bed! Naturally, Galen's deductions were not always correct; but he did get very near the mark at times. He deduced that the arteries and veins anastomosed and exchanged spirits and blood by certain invisible passages.

His outstanding ability was equalled only by his unbounded boastfulness, for he once said: "Whoever seeks fame need only become familiar with what I have achieved!" It is true that we have at the present time some who are worthy rivals of Galen in the possession of the latter attribute, but, unfortunately, not the former. Indeed, when one contemplates the work of some of these ancient physicians, unaided as they were by the solid foundations of science on which we build our new knowledge, it is not their ignorance, but their knowledge, that astounds us.

Andreas Vesalius (1514-1564) has been described as the most commanding figure in European medicine after Galen and before Harvey, and by the passage that "there were plenty of dissectors before Vesalius, but he alone made anatomy what it is today—a living science". His passion for dissecting forced him to risk losing his life at the hands of the Inquisition for cutting down thieves from the gibbet and "dragging them, stinking, home". There he discovered the form, position, structure, and the valves of the heart, and, greatest sin of all against the traditional anatomy, that Adam's rib was still present.

He would have none but the finest artists to illustrate his book on anatomy, but we are informed that, as there was no formalin to preserve the bodies, it is not surprising that the artists found less pleasure in decaying viscera than in the lively limbs of a living signorina.

An affair connected with the heart was a prelude to his death, for, either to escape from a nagging wife or to evade the Inquisition, which was anxious to burn him at the stake because during a *post mortem* examination he had had the misfortune to find the heart still pulsating, he made a trip to the Holy Land. During his return journey he was wrecked on the island of Zante, where he subsequently died. And so ended a life spent in battling

[1] Read at a meeting of the History of Medicine Section of the South Australian Branch of the British Medical Association on August 14, 1935.

against the tyranny of tradition. But he won the battle.

Servetus (1509-1553) actually solved the mystery of the pulmonary circulation, for he wrote:

> The vital spirit is generated by the mixture in the lungs of the inspired air with the subtly elaborated blood which the right ventricle sends to the left. The communication between the ventricles, however, is not made through the midwall of the heart, but in a wonderful way the fluid blood is conducted by a long detour from the right ventricle through the lungs, and becomes red in colour and passes from the *arteria venosa* into the *vena arteriosa*, whence it is finally drawn by the diastole into the left ventricle.

In passing I merely mention:

1. Erasistratus (fourth century B.C.), who conceived the heart as a pump, found the aortic and pulmonary valves and counted the pulse with a water clock.

2. Rufus of Ephesus (early second century), who noted the relationship between the systole of the heart and the pulse.

3. The versatile Leonardo da Vinci, whose masterly brush portrayed the results of his dissections.

4. Linacre, the founder of the Royal College of Physicians, and its first president in 1518, who wrote *"De pulsum usu"*.

5. Paré, who associated aneurysm with syphilis and was the first to ligature a bleeding artery.

6. Cesalpinus (1524-1603), who made a good guess at the circulation of the blood but had no proof whatsoever of his theory.

We now arrive at the beginning of modern cardiology and, indeed, the foundation of the science of physiology, both of which had their birth in the conception and proof of the circulation of the blood by Harvey.

The progress of science in the seventeenth century was due to individual effort, exemplified best of all by the work of Harvey (1615-1656), which was fraught with such far-reaching consequences that, notwithstanding the fact that much concerning him and his work is familiar to most of us, I think it behoves us to linger here a while.

One difficulty of that time was the scarcity of dissecting material, so that D'Arcy Power says:

> Dissection came to be looked upon as part of a legal process so inseparably connected with the death penalty for crime that it was impossible to obtain even the body of a stranger for anatomical purposes.

In spite of limited scope, Harvey made routine investigations under the guidance of many rules he had formulated, and, were we to adopt his outlook and follow some of his precepts, we would all make good progress.

He said:

> True philosophers who are only eager for truth and knowledge never regard themselves as already so thoroughly informed but that they welcome further information from whomsoever, and wheresoever, it comes . . . nor do philosophers pin their faith to others' precepts in such wise that they lose their liberty and cease to give credence to the conclusions of their proper senses.

Yet for how long has this teaching been disregarded and have old errors been handed down as gospel from text book to text book? The tyranny of tradition! One of his rules was "to state things briefly and plainly, yet not letting anything pass unmentioned which can be seen".

From 1615 to 1656 he delivered the Lumleian Lectures at the Royal College of Physicians, where even now some of his dissections are in such a state of preservation that one still shows the aortic valves. Although he lectured on the circulation as early as 1616, it was not until 1628 that he published his epic, *"De motu cordis"*, at Frankfurt. One reason why he went there was that he was well aware of the controversy it would arouse; indeed, as an outcome of this it is said "he fell mightily in his practice". In his volume he established the heart as a muscular force pump, so providing evidence in favour of the myogenic theory. He wrote: *"Cor, imperator, rex."*

He adduced proof from vivisection, perfusion and ligature, the crux of his argument being that the quantity and velocity of the blood made it impossible for it to do otherwise than return to the heart by the venous route. This work was the starting point of purely mechanical explanations of vital phenomena, or, in other words, of physiology.

Borelli, who studied Harvey, thought that muscle contracted owing to the fermentation of *succus nerveus*, and so might be said to have originated the neurogenic theory.

We cannot pass on to the eighteenth century without mentioning Sydenham, the first man to describe chorea, which later was to be associated with endocarditis.

We now come to the period of theories and systems and, in passing, mention: Albertin, who associated the symptom of breathlessness with disease of the heart; Boerhaave, who described a case of prodigious dilatation of the heart and who died of heart disease himself; Haller, who reaffirmed that the heart was a muscular pump; Scarpa, who was the first to delineate the nerves of the heart; John Hunter, who kept a real menagerie for purposes of comparative anatomy. While wrestling with a bull, Hunter endeavoured to study its powers of self-defence, but the bull decided that offence was to be the order of the day, and it was a case of the Hunter being hunted and barely escaping. After experimentally ligaturing the external carotid artery of a young buck, he found that the antler became cold but subsequently became warm again. This gave him the idea of ligaturing the femoral artery in Hunter's canal for the cure of popliteal aneurysm. Ryle thinks that Hunter's first seizure in 1773 was an attack of coronary thrombosis, because of the persistent pain, pallor, lack of pulse, and apnœa, and because of the scars found in the heart muscle *post mortem*.

In 1761 Auenbrugger introduced percussion, prefacing his description by saying that he was not writing from *pruritus scribendi* or as a result of armchair theorizing, but from practical experience. He stipulated that the hand should be covered with

a glove (or the thorax with a thin shirt) to avoid friction sounds. The thorax ought to be struck slowly and gently with the points of the fingers brought close together and extended. As he anticipated, his method was not recognized by his contemporaries, but just a year before his death Corvisart, Napoleon's director-general of medical services, discerned its great value and very unselfishly gave full credit for the discovery to Auenbrugger. Ever since, percussion has been an essential part of the physician's examination. However, as regards its use in estimating the size of the heart, opinion has changed, for, whereas Mackenzie assured us that an X ray examination of the heart was of little value and that percussion was all that was necessary, it is now held, even by the conservative English physicians, that screening of the heart is essential for the above purpose, while percussion is extremely inaccurate. A complete investigation of a patient with a cardiac condition therefore includes screening in the anterior and both oblique positions.

About this time many important advances were made in the knowledge of cardio-vascular diseases. Morgagni associated aneurysm with syphilis, described diseases of the cardiac valves, and was the first to describe a case of heart block. Baillie was a worthy follower of Morgagni and a nephew of William Hunter. He established pathology on a proper footing as a subject on its own, and mentions rheumatism of the heart, to which Pitcairn first called attention in 1788. These are the first shadows cast by a condition destined to occupy so important a place in cardiology.

A very able physician was William Withering, of Shropshire (1741-1799). Garrison says that not only was he an admirable observer of the English school, but a man of unusual versatility. He was one of the greatest of medical botanists, wittily called "the flower of physicians". In 1776 he learnt from an old dame in Shropshire that foxglove was good for dropsy, so he immediately tried it in his cardiac cases. Medical men, even in those days, ran any new treatment to death, so we find only nine years later that Withering had to write a protest about the abuses of digitalis which were already creeping in. He did not know the distinction between cardiac and renal dropsy, and it was left to Bright (1789-1858) to differentiate them. Incidentally, the latter was the first to describe a bruit in chorea. Much work has since been done on the use and method of administration of digitalis.

In the nineteenth century we find that Oswald Schmiedeberg, working under Ludwig, investigated the action of poisons on the frog's heart and also did some work on digitalis. Very important researches were made by Cushny (1866-1926) on the effects of digitalis on heart muscle, and in 1899 he recognized the similarity between clinical *delirium cordis* and experimental auricular fibrillation. He showed how the effects of this drug could be checked up by the use of the electrocardiogram, which will present an alteration in the *S-T* region, varying with the amount administered, this change taking about three weeks to wear off. The effects of heavy dosage are a depression of the conductivity of the bundle of His, and, later, extrasystoles and coupling, and even auricular fibrillation.

Although Lauder Brunton watched the action of digitalis very closely, it is his discovery of the value of the nitrites in *angina pectoris* that is his great claim to fame. In 1910 the revered Sir James Mackenzie described the mode of action of digitalis in cases of auricular fibrillation, and it is in this condition and the allied one of flutter that it finds its greatest scope. Eggleston introduced the exhibition of massive doses in cases in which a rapid effect is required.

Various men have from time to time used strophanthin, and certainly a heart that is racing under the lash of fibrillation can be slowed down to a normal rate by intravenous injection of this drug. Recently 0·65 milligramme ($^1/_{100}$ grain) of strophanthin *E* has been used. One should also mention the intravenous use of digoxin, which is exhibited in extremely urgent cases.

William Heberden (1710-1801) is remembered for his description of *angina pectoris*, which he put on a scientific basis and explained to the Royal College of Physicians in 1768. Morgagni and Rougnon had cases of this disease, and even Erasistratus and Seneca described something like it. However, Heberden's description is so accurate that it will be worth our while to study some of his phrases from "History and Cure of Diseases".

> But there is a disorder of the breast . . . the seat of it and sense of strangling and anxiety with which it is attended may make it not improperly be called *angina pectoris* . . . the *angina pectoris*, as far as I have been able to investigate, belongs to the class of spasmodic, not of the inflammatory complaints. . . .
>
> (1) Its sudden access.
>
> (2) There are periods of perfect health between the attacks.
>
> (3) Wine and opium give relief.
>
> (4) Attacks are increased by disturbance of the mind.
>
> (5) It often continues for years without injury to the health.
>
> (6) In the beginning it is not brought on by riding on horseback or in a carriage, as is usual in disease arising from scirrhus or inflammation.
>
> (7) During the fit the pulse is not quickened.
>
> (8) Lastly, the attacks are often after the first sleep, which is a circumstance common to many spasmodic disorders.

Let us compare this with the conception of some modern writers who consider angina to be due to spasm of the coronary vessels. I am well aware that there is much controversy on this subject and that many things are still *sub judice*, but this does not detract from the merit of Heberden's conception.

Mackenzie and Osler have also given us very good accounts of the condition. Heberden's words, "on opening the body of one who died suddenly of this disease a very skilful anatomist could discover no fault in the heart, in the valves, in the arteries or neighbouring veins, excepting some small rudiments of ossification in the aorta", describe the findings at many modern *post mortem* examinations when

insufficient dissection and histological study are made.

The main theories concerning the cause of pain in angina may be summarized as follows: (i) Clifford Allbutt thought that the aorta was the source from which the pain of angina arose. The pressure of the blood in the aorta distended diseased areas and caused pain. (ii) Wenckebach has given strong support to this theory with some qualifications. (iii) Mackenzie put forward the theory that *angina pectoris* arises through exhaustion of the heart muscle. We now know that many of the cases recorded by him were really cases of coronary thrombosis. (iv) Lewis gathered from his experiments that the pain arose from anoxæmia of the myocardium, but Samson Wright states that it is really due to accumulation of *P* substance, or waste material, in the muscle. Whichever of these two is correct, it makes but little difference to the clinician, because the causal factor is the same, that is, interference with the coronary blood supply.

Hence in most cases we can agree with John Parkinson that angina and coronary thrombosis are signs of diseased coronary vessels, and that many patients with angina die from coronary occlusion, just as many people who recover from coronary thrombosis suffer from angina of effort.

Parry (1755-1822) described exophthalmic goitre with great accuracy in 1786 and included in his description an account of the cardiac changes. Graves also made a special study of this disease, and it is by his name that it is often called. He was one of the renowned group of Dublin physicians, being the lifelong friend of Stokes. He desired the following epitaph to be inscribed on his tombstone: "He fed fevers", for here he made a very revolutionary improvement.

The nineteenth century was noted for the organized advancement of science.

The first to whom we must pay attention is Laennec, who was born in Brittany in 1781, but, unfortunately, he lived for only forty-five years. Prior to his advent, immediate asucultation had been used on a few occasions, but not to any great advantage. Even Hippocrates is supposed to have tried it. In one of his patients Laennec found difficulty in finding any physical signs, owing to the thickness of the thoracic wall and the female breast, so he rolled up a sheet of paper into a cylindrical shape and used it as the first stethoscope.

He did a great deal of his work under the patronage of Corvisart, whom Napoleon, with his usual flair for choosing an able man to manage any department, had appointed his director-general of medical services. Corvisart wrote an essay on the diseases and organic lesions of the heart and great vessels, but it is more for reviving Auenbrugger's discovery of percussion and his encouragement of Laennec that we remember him. Nevertheless he was a very able and far-seeing physician.

In dealing with the famous Dublin school, which did so much to bring about the advance of medicine at this period, I will go into some details connected with William Stokes (1804-1878), because it was he who laid stress on several important matters that have many times since been learnt and forgotten, only to be learnt again. First of all he encouraged original observation, for, referring to medical education, he said: "One great merit in which the existing system is deficient, namely, the large opportunities for cultivating the faculty of original observation." As Professor Baynes says: "It is not at school, but by his own self-imposed studies afterwards that a man is educated."

Stokes recognized in Laennec's discovery a new and powerful weapon to aid him in diagnosing many complaints, and after some experience with it he wrote a treatise on the use of the stethoscope.

Reading his life causes us to ponder once again the old problem of what shall we tell the patient. His friend, Dr. Macnamara, was dying. "He asked me: 'Am I dying?' I told him the truth." How often are we confronted with the problem? Does not the answer vary according to the type of patient?

We are indebted to Stokes for pointing out the danger of studying the physical signs to the detriment of equally or more important features of cases, a danger never more to be guarded against than at the present time, when we have so many aids to diagnosis that it is very easy to forget that, after all, a careful history and clinical examination are of paramount importance.

Stokes pointed out that Laennec's students "neglected to attend to the fact that physical signs only reveal mechanical conditions which may proceed from different causes, and that the latter are to be determined by a process of reasoning on their connexion and succession, on their time relation, and their association with symptoms".

Sir Dominic Corrigan, also one of the big four at Dublin, agrees with Stokes when he says:

> It is in the curable diseases that the great value of physical signs is seen. Indeed, in a large proportion of cases the first effect of treatment is to render the disease latent, and to cause an absolute necessity for the study of physical signs.

During this period Ireland was so sorely smitten by fever and famine that Sir Robert Gore Booth hired some vessels to take some of the unfortunate people to America. The story has it that one young fellow, who had a ticket for himself and his mother, arrived at the quayside accompanied by a pretty young colleen. Sir Robert immediately asked: "Is she your mother?" "No, your honour, she is instead of her." The girl was then put wailing ashore. Sir Robert then asked: "Are you married?" "No, your honour, the priest would not marry us." "Why not?" "Because she was not my mother, sir." Sir Robert then persuaded the priest, and the couple sailed away in married bliss.

When Stokes published his book on diseases of the heart and aorta, the German comment was that whereas their own school considered physical diagnosis only, he associated signs and symptoms. He emphasized the fact that in heart disease the

differentiation of the various valvular lesions was not so important as the estimation of the condition of the heart as a whole—a fact since stressed by Mackenzie.

Lewis also has pointed out that the extra work necessary to compensate for valvular deficiency is usually small as compared with that needed during heavy physical exertion, and that a heart muscle that is healthy finds no difficulty in coping with the extra load. It is the diseased myocardium that cannot do so, and therefore the prognosis depends on the muscular condition, or, as Stokes said, on the condition of the heart in general. He also sought to discover whether murmurs were organic or inorganic; yet how frequently have modern physicians allowed their view of a condition to be swayed unduly by the presence of some murmur which they could not understand? He described Cheyne-Stokes respiration in connexion with fatty degeneration of the heart, a condition observed by Cheyne, though not connected by him with any special cardiac lesion.

Paracentesis is also mentioned in the treatment of pericardial effusion. In the therapeutic section of this book we find directions for training up a weak myocardium by means of graduated exercises. First, he persuaded the patient gradually, but steadily, to give up luxurious habits and to adopt early hours. Then he progressively increased the amount of deep breathing and exercise until eventually the patient could take a reasonable amount of exercise with both profit and pleasure as a result. By these methods, later to be reintroduced as the Schott methods, he was enabled to banish the symptoms of debility of the heart, but he was always careful to go very slowly with older patients.

With the emphasis that was later laid on the necessity for rest in heart disease, the gymnastic treatment fell into disrepute, perhaps more so in England than on the Continent, where spa treatment, combining stimulating baths, exercise and general measures, has always had its advocates. It seems only rational that a heart that is lacking in tone, and working in a body in a similar state, is going to function more effectively if it has a course of training at the same time as the body muscles. This view is finding a little more favour in England at the present time, but mainly in cases of disordered action of the heart, or "soldier's heart". Apart from describing several types of cardiac disorder, he mentioned the use of mercury in weak dilated hearts with hepatic enlargement.

Thomas Addison also knew the value of a little mercury; hence the famous Addison's or Guy's pill, which was first used with signal success at Guy's Hospital. This drug has survived the test of time with honour, for now our most effective diuretic in cardiac complaints is a mercury compound, "Salyrgan".

It seems almost as though Stokes had foreseen the plight of the medical man at the Adelaide Hospital today, for he observes that "there can be no greater error than to compel a medical officer to attend to a number of patients beyond that which his mental or physical powers can reach", and continues, "rendered unfit to perform duties which, of all others, require a quiet mind and a vigorous frame".

Robert Adams, the fourth of the group, is remembered for his work on heart block, the fainting seizures of which have been known as Stokes-Adams attacks, although now, for some reason, the fashion in England seems to be to name them Adams-Stokes attacks.

Perhaps we should have done more than merely mention Corrigan's name as a member of this group which did so much for the progress of cardiology and general medicine, for he in particular was a keen cardiologist. Not only did he write a book on diseases of the heart, but in 1832 he presented the classic description of insufficiency of the aortic valve, although this had previously been mentioned by Cowper, Vieussens and Hodgkin. He it was who described the pulse in this disease as receding, or water-hammer, in type. He also suggested stimulating a flagging heart by tapping the precordium with a hot spoon. He described the expansile impulse of aneurysm, this sign being known as Corrigan's sign.

As we go we must glance at Wells, of South Carolina, who made the earliest report on the cardiac complications of rheumatism; Hodgson, who mentioned aneurysmal dilatation of the aortic arch; and James Hope, who did much for the knowledge of murmurs, aneurysm and valvular disease.

Carl Rokitansky (1804-1878), a Bohemian, made over 30,000 *post mortem* examinations in his life and was the first to detect bacteria in the lesions of malignant endocarditis, a disease that has been investigated by many men since, not the least among whom being Lord Horder; but any satisfactory treatment has yet to be discovered.

Remak (1815-1865) discovered ganglion cells in the frog's *sinus venosus*. In 1907 Sir Arthur Keith, with Flack, found at this site the specialized tissue which constitutes the autonomous centre that initiates the heart's contraction. They named this area the sino-auricular node, which Sir Thomas Lewis in 1910-1913 referred to as the pacemaker of the heart.

Purkinje, of Bohemia, was a very eminent pathologist and physiologist who described the Purkinje fibres of the cardiac muscle in 1839. He was perhaps fortunate to have survived to do this, because his experiments on the action of various drugs were made upon himself.

As the number of research workers now becomes greater almost by geometrical progression, I intend first to deal briefly with a few of the most outstanding of them and then to describe the mode of advance in the knowledge of certain branches of heart work.

Sir Lauder Brunton says we owe our present knowledge of the circulation more to Carl Ludwig

(1816-1895) than to any other since Harvey. In his anxiety for the progress of his work and his desire to aid his pupils, he had no thought for bringing his own name before the public eye. However, Garrison says that he was perhaps the greatest teacher of physiology that ever lived.

Most of his important discoveries were published under names of his students, some of whom merely sat on the window sill while Ludwig and his faithful assistant, Salvenmoser, did the work.

He introduced to physiology some graphic methods with new instruments, such as the kymograph, blood pump and the *Stromuhr* for measuring the amount of blood flowing in unit time. He ligated all vessels to and from the heart and proved that the first heart sound was not all valvular, but consisted partly of a muscular element. In 1848 he found ganglion cells in the interauricular septum. These are some of the most important of his many discoveries.

Gaskell worked for a time in Ludwig's laboratory and, although he did a great deal of investigation into cardiology, we remember him best for his great memoir on the musculature and innervation of the heart in 1881, in which it is shown that the motor influences from the nerve ganglia in the *sinus venosus* influence the rhythm, rate and force of the heart, but do not originate its movements or beats, which are due to the automatic rhythmic contractile power of the heart muscle itself and to the peristaltic contraction wave which proceeds from *sinus venosus* to *bulbus arteriosus* and from muscle fibre to muscle fibre. In other words, he made out a very strong case for the myogenic theory, a theory which the modern findings amply support. He showed that denervated strips of muscle conducted the contraction impulse, and also that it could be conducted in a reverse direction. He introduced the term heart block and produced 2:1, 3:1 and 4:1 blocks experimentally, also auricular fibrillation. He was the first to investigate the electrical condition of the heart with a galvanometer.

As Sir James Mackenzie is well known to all of us by his works, I shall be content with saying that he did cardiologists an invaluable service when he sorted out the cardiac arrhythmias by using the graphic methods, and yet again when he pointed out that the most important thing to find out was how much work the heart could do, thus directing the efforts of subsequent research workers towards the energetics of heart muscle.

Sir Thomas Lewis has done a very great deal for the science. When Mackenzie differentiated "nodal rhythm", Lewis called it auricular fibrillation and identified it with the *pulsus irregularis perpetuus* of Hering, producing it experimentally by sewing electrodes into the auricle of an animal. Here we should mention his electrocardiographic investigations and his view that auricular fibrillation and flutter are due to circus movement, which is quite consistent with the action of digitalis and quinidine in these disorders.

As regards the use of mechanical methods of investigation, it must be admitted that they have been of immense value in differentiating many abnormal conditions; and not only have they done this, but they have made their method of production so clear to us that we are now able to diagnose the majority of those conditions by ordinary clinical examination without instrumental aid.

Marey invented the sphygmograph, from which Mackenzie derived his polygraph. This, however, is now of little practical value when portable electrocardiographs are available and reliable. They were not always reliable, as one London cardiologist is well aware, for he set off from London one day, and after travelling seventy-five miles had to return because the instrument refused to function.

In 1878 Sanderson and Page made their first studies of the heart beat with a capillary electrometer.

In 1889 Waller conceived the idea of measuring and figuring the action currents of the heart by leading them off through electrodes placed on the moist skin and connected with a galvanometer, the curves being obtained by photographing the movements produced by the mercury of a Lippman electrometer, but the lag of the mercury meniscus had to be allowed for. These tracings were rendered accurate by the invention by Einthoven, in 1902, of his string galvanometer.

Electrocardiographic research is still opening up new ground, its biggest recent success being perhaps in the diagnosis of coronary thrombosis or occlusion. This condition is the terminal event in many cases of coronary artery disease, but at the same time it must be remembered that 50% of patients survive the first attack.

Hyrtl (1810-1894) found the origin of these vessels, although part of their course had been known for many years, for in 1698 Chirac tied a coronary artery in a dog, to find that it brought about the stoppage of the heart.

Harvey is supposed to have described a case, complete with pathological findings, but did not interpret it correctly. Jenner thought *angina pectoris* due to ossification of the coronary arteries, and in 1842 Marshall Hall associated sudden death with the coronary circulation. The first case diagnosed during the life of the patient as coronary occlusion was that presented by Hammer in 1878. Dock noticed the associated pericarditis as early as 1896. Osler, in 1910, correlated the clinical and pathological findings.

Herrick's work in 1912-1918 and 1919 gave us a clear picture of the disease, and was important also because in it he drew attention to the fact that some patients do recover. Since then Wearn, Leone, White, Pardee, Willius, Parkinson and Bedford have enriched our knowledge, the last mentioned two, in an able exposition, giving due praise to the American workers who stole a march on their English colleagues in this field, and pointing out the association between coronary thrombosis and

angina, which are both usually complications of disease of the coronary arteries.

The history of blood pressure is bound up with the name of Hales, who took the first readings in 1726 and so started what was to become a pernicious practice, for I really believe that the harm done by making patients interested in their blood pressure readings far outweighs the benefit derived from the information gained by the physician. Hales was followed by Magendie, Poiseuille, Cabot and Riva Rocci, who invented his sphygmomanometer in 1903.

We previously dealt with the discovery of the pacemaker of the heart, but omitted to consider the other tissue rests which complete the conducting system.

In 1893 William His, junior, discovered the auriculo-ventricular bundle which conducts the contraction impulse from the auricles to the ventricles, and which bears its finder's name. Stanley Kent also has some claim in this. Although Bidder found the ganglion cells of the auriculo-ventricular node in 1842, it was not until 1906 that Tawara recognized the true function of that area; hence the node is sometimes known as the node of Tawara.

The electrocardiograph has, of course, demonstrated changes, both passing and permanent, in the conducting system.

Operations on the heart do not play a very important part in cardiac therapy, because they are directed against mechanical difficulties, and these, excepting affections of the pericardium and wounds, are nearly always the cause of such a small part of the heart's embarrassment that their removal would not provide sufficient relief to justify the risk.

The Italian surgeon Guido Farnera sutured the right ventricle in 1896. Cardiolysis was proposed by Brauer in 1902. Cutter did a mitral stenotomy in 1926; but, if I remember correctly, Souttar did one in 1925. Strickland Goodall, ever a friend to Australian students, devised this operation even earlier. We deeply regret that he succumbed to his second attack of coronary thrombosis about nine months ago.

In 1916 Jonnesco removed the three sympathetic cervical ganglia, with subsequent relief of pain in some anginal patients; but these operations are still in the experimental stage, and it must not be forgotten that they relieve the symptom and not the disease. Moreover, the removal of the pain abolishes a warning sign which otherwise would protect the heart.

In a belated conclusion some mention must be made of circulatory failure, which, although sometimes due to a peripheral failure, is in most cases due to cardiac failure. Hippocrates noticed the symptoms that we associate with failure, but he took the symptoms for the disease. Sydenham was the first to group the symptoms together, but even he did not associate them with heart disease. It was left to that great clinician Laennec to give the first account of congestive failure associated with cardiac failure.

The original explanation of this process was known as the back pressure theory, but this was only partly correct. Then came the view that it was due to lack of *vis a tergo*, or, in other words, to myocardial deficiency. This is correct in so far as it stresses the importance of the cardiac muscle, but it is not the complete explanation, for so often other influences come along, for example, the strain of an extra effort, a paroxysm of abnormal rhythm occurs, or ventricular fibrillation sets in to complicate the mechanism of failure.

Many modern workers have measured the circulation rate *et cetera* in an endeavour to solve this problem of failure, and the further they go, the more complex does the mechanism prove to be. As these details of the many complicated natural processes in health and disease become unravelled, we may look forward to that time when the future of our patients will not be hidden, and we shall no longer find it necessary to deliver the guarded prognosis on the many occasions when it is now used because we know not what may befall.

PROPAGATION OF THE VIRUS OF EPIDEMIC INFLUENZA ON THE DEVELOPING EGG.[1]

By F. M. BURNET.
(From The Walter and Eliza Hall Institute, Melbourne.)

THE isolation of a typical strain of influenza virus from a Melbourne epidemic has recently been described (Burnet, 1935). The virus produces characteristic symptoms and pathological changes in ferrets and mice and is immunologically similar to the English strain W.S. It was of interest to determine whether this virus was capable of growth on the chorio-allantoic membrane of the developing egg, a technique which has been found applicable to a wide range of viruses.

The technique of inoculation was the same as that used in previous work (Burnet and Galloway, 1934), except that, as a routine, eggs at the twelfth day of incubation were used. Membrane filtrates, either from mouse lung lesions or from the nasal mucosa of infected ferrets, gave rise to suggestive but rather vague changes on the inoculated chorio-allantoic membranes, and a series of passage experiments were made with appropriate animal tests at intervals. It can now be stated that influenza virus can be readily propagated on the egg and in a fairly large proportion (30% to 50%) gives rise to readily visible characteristic lesions.

The passage series to be described was initiated by inoculating eggs with a membrane filtrate made from nasal mucosa and lung of Ferret 10, which was killed during the secondary temperature rise of a typical attack of ferret influenza. For passage,

[1] This work was carried out under a grant for work on virus diseases from the Commonwealth Government Department of Health and the Rockefeller Foundation.

membranes were removed from the egg to sterile saline solution in a Petri dish and examined for lesions with a lens against a dark background. Membranes with distinct lesions were then placed in broth tubes and left in the refrigerator till convenient. To prepare the inoculum the membrane was ground with quartz powder and four or five cubic centimetres of broth. This was centrifuged at fairly high speed in an angle centrifuge for five to ten minutes and the supernatant fluid inoculated.

Table I. combines the relevant data from this passage series.

TABLE I.

Chorio-allantoic Membrane Passage of Influenza Virus.

Passage Number.	Egg Membrane Lesions.			Results of Subinoculation of Membrane Lesion Emulsion to—	
	+	±	0	Ferrets.	Mice.
1		3	5		0, 1, 3, 4
2		2	1	F14 41·1° C. (106·1° F.)+	1, 2, 2, 3
3	1	4			1, 1, 1, 2
4	2	2			1, 2, 2−, 3
5	3	1		F17 40·4° C. (104·7° F.)+	
6		1	2		
7	5	1			0, 1, 1, 2−
8	3	3			
9	3			F16 41·0° C. (106·0° F.)+	0, 1, 1, 3
10	2	3	1		0, 1, 2, 3
11	3	3			
12	5				0, 0, 1, 2
13	4				0, 0, 2, 2
14	3	1		F21 40·5° C. (105·0° F.)+	

Egg membrane lesions: + = typical lesions with well defined foci; ± = weak lesions without distinct foci; 0 = membranes showing no recognizably specific lesions.

Ferrets: + indicates the occurrence of typical symptoms, sneezing, nasal discharge *et cetera*, and the highest temperature attained in the primary rise is shown.

Mice: The lesions are tabulated according to the scale used by Andrewes, Laidlaw and Smith. 0 = no lesions; 1 = small pneumonic patches less than three millimetres in diameter; 2 = moderate lesions; 3 = extensive pneumonic areas in several lobes; 4 = complete or almost complete consolidation.

The numbers of egg membranes showing well defined lesions (+), vaguer but recognizably specific changes (±), and indefinite or no lesions (0) are shown for each passage, as well as the results of subinoculation of emulsified membrane lesions into susceptible animals.

The table requires little comment. Perhaps the most interesting feature is the relative constancy of the virulence for mice and ferrets.

Appearance of Chorio-Allantoic Membrane Lesions.

The macroscopic appearances of infected membranes vary considerably, but a well developed lesion three days after inoculation has quite a characteristic appearance. When the egg is opened the membrane shows very little abnormality. There is a slight haziness due to œdema, and, looked at obliquely, a faint irregular granularity is evident. The lesions are much less obvious than those produced by viruses like vaccinia, fowl-pox and laryngo-tracheitis of fowls, and can be clearly seen only when the membrane is removed and examined in saline solution against a black background. If the membrane is not required for passage, it is best to "set" the membrane by stretching it out on paper wet with ordinary formol-saline solution and after ten to fifteen minutes retransferring it to a Petri dish of saline solution for examination with a hand lens. The specific lesions take the form of tiny white foci, never more than 0·5 millimetre in diameter and ranging down to the limit of visibility. In the better developed lesions these foci take the characteristic virus form of a central opaque spot surrounded by a lighter halo, but quite often the halo cannot be observed. As a rule, only portion of the membrane shows discrete foci; other parts are covered with confluent or semiconfluent opacities of similar weak intensities, in which focal distribution is only vaguely apparent. Some of the opacity is clearly on the ectodermal surface, but much of it is due to œdema and cellular accumulation in the intermediate mesodermal layer.

These appearances are very similar to those produced by louping-ill virus and far more tenuous than the lesions produced by viruses like vaccinia and fowl-pox. It is perhaps not altogether inapt to compare the difference with that which exists between the appearances of colonies of *Hæmophilus influenzæ* and *Staphylococcus aureus* on blood agar plates. Certain non-specific lesions, such as occasionally follow inoculation of eggs with mixtures containing mammalian serum, may show a pseudo-focal distribution and be indistinguishable with certainty from the less distinct influenza virus lesions. It will be seen from Table I that the lesions appear to have become more distinct with passage. This may be in part due to subjective factors associated with increased experience in the examination of membranes, but it gives rise to a hope that continued passage may result in the development of an improved capacity to produce easily recognizable egg membrane lesions.

Histology of the Lesions.

The histology of the chorio-allantoic membrane lesions has been studied in sections from membranes of various ages. Mann's stain has proved the most satisfactory for general purposes. Like all virus infections in this situation, the first detectable lesion is a slight focal thickening of the ectodermal layer, showing one or two necrotic cells situated on the free surface of the ectoderm with commencing proliferation of the immediately adjacent ectodermal cells. From this centre the process spreads outward to a limited extent, maintaining throughout the rule that central superficial cells show degenerative and necrotic changes, while the peripheral deeper cells proliferate. By the second day the lesion has advanced practically to its height and reparative changes are commencing. These defence processes are very similar to those found in the lesions produced by other viruses, which have only a limited power of growth on the egg membrane, such as ectromelia, psittacosis and louping-ill viruses. The infected and necrotic cells are invaded by leucocytes and the necrotic mass is segregated off from the deeper cells of the proliferated ectoderm by a progressive cornification of the cells in

immediate contact with the necrosed material. By the third day this process is practically complete and sections show only patches of completely degenerated acidophilic material lying on moderately proliferated and partially cornified ectoderm.

The degenerative changes in infected ectodermal cells which precede necrosis do not show any features specific for this virus—histologically, as well as macroscopically, it would probably be impossible to distinguish with certainty between membranes infected with louping-ill virus and with

Chorio-allantoic membrane, showing typical discrete lesions due to influenza virus. × 25.

influenza virus. The cellular changes involve both cytoplasm and nucleus. The cytoplasm becomes lightly staining, foamy or grossly vacuolated. It may contain acidophile bodies of various sizes, but these are probably fragments of broken-down nuclear material and not specific inclusions. Nuclear changes are variable, but are always in evidence. Probably in association with the initial proliferation the nucleoli become larger than normal, and it is common to find very great nucleolar enlargement as degeneration progresses. Such nucleoli in Mann-stained sections often show a general red staining with a few beads of dark purple at the periphery. Frequently enlarged nucleoli persist after disintegration of the rest of the nucleus, and the rather frequent acidophile bodies of very variable size and appearance which are found in these degenerating areas are probably largely of nucleolar origin. Other nuclei appear to disintegrate in a different fashion, enlarging, and losing their staining capacity more or less uniformly.

Apart from the ectodermal changes, the only points of interest histologically are the active migration of bilobed eosinophile leucocytes to the infected membranes and the enlargement and proliferation of the endothelial cells of the most superficial capillaries which lie almost in the ectodermal layer. The leucocytic response is very striking and probably more intense than in any other virus lesion so far examined. Many of the small and medium sized blood vessels show eosinophile leucocytes adherent to their wall. In one medium sized vessel there was a complete layer of these cells lining the wall. The mesodermal layer is thickened by œdema, but, apart from eosinophile leucocytes and, close to the ectodermal layer, proliferated endothelial cells, there is relatively little cellular reaction. The entoderm shows no change apart from the inevitable slight thickening common to all lesions of the chorio-allantois.

Discussion.

The positive results obtained in these experiments with the developing egg are of no great intrinsic importance now that two suitable experimental animals, ferrets and mice, are available for the study of influenza virus. Any new method of attack, however, may yield results which could not be obtained with the classical methods, and a study of the potentialities of the egg method in influenza work will be continued.

In the near future it is highly probable that attempts at immunization of human beings with killed or attenuated influenza virus will be made, and here the egg membrane technique may find a very important practical application. It allows growth of influenza virus which is certainly free from contaminating viruses or bacteria and a priori should almost certainly provide a much more suitable "raw material" for the preparation of antigens than either ferret or mouse tissues.

Summary.

1. The virus of epidemic influenza has been propagated for fourteen generations on the chorio-allantoic membrane of the developing egg.

2. Characteristic lesions are produced, the macroscopic and microscopic features of which are described.

3. The method may serve as a useful method of preparing antigens for immunization against influenza.

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F. M. Burnet: "Influenza Virus Isolated from an Australian Epidemic", THE MEDICAL JOURNAL OF AUSTRALIA, November 9, 1935, page 651.

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Reports of Cases.

A CASE OF SEMINOMA TESTIS TREATED BY DEEP X RAY THERAPY.

By ALAN B. S. OWEN, M.B., Ch.M. (Sydney), M.R.C.P. (London),
Sydney.

THIS case is reported because of the comparative rarity of the condition, the dramatic disappearance of secondary seminoma of the lumbar lymph glands under deep X ray therapy, some interesting pathological findings, and because it may lead to the report of other similar cases.

Clinical History.

The patient, B.C., aged forty-four years, first came under medical observation in September, 1929. He stated that he had had pain and swelling of the right testicle for three months. On examination the tumour was found to be cystic in part, but a hard nodular area was felt at its upper end. A trocar was inserted and a small amount of blood-stained fluid was withdrawn. The tumour gradually enlarged during the next two weeks. A diagnosis of malignant disease was made and operation was advised. This was carried out on September 24, 1929, the swollen right testicle together with the cord as far as the internal inguinal ring being removed. At the time the inguinal canal was widely opened and the abdomen was explored. The vermiform appendix was removed and the canal was repaired by the method of Bassini.

The patient remained well until November, 1931, two years and two months after operation, when he returned complaining of pain in the back. On examination a large mass, obviously due to enlarged lumbar lymph glands, was found to be present in the upper part of the abdomen. He was referred to the radiographer and then to the radio-therapeutist. The X ray photographs of the chest and vertebral column showed no evidence of metastases. The radio-therapeutist's report was as follows:

> The patient saw us on November 25, 1931, when he gave a history of removal of the right testicle in September, 1929, and the appearance of a metastatic mass in the abdomen in October, 1931. On November 25, 1931, we commenced X ray treatment to a mass at least six inches in diameter in the right side of the upper part of the abdomen; 7,000 *R* (French) units were given to the area with the technique shown in the accompanying table.
>
> On December 22, 1931, that is, within a month, the tumour had been reduced to approximately two inches in diameter. On February 6, 1932, the tumour was hard and small, being about one and a quarter inches in diameter, and the patient was feeling generally very well, with no other symptoms or signs of the disease.

He did not report for further deep therapy, but came under observation in July, 1934, that is, after another interval of two years and eight months, when he complained of increasing shortness of breath, necessitating confinement to his home, where he was seen regularly. On August 3, 1934, when I first saw him, he still had shortness of breath and also complained of pain in the left shoulder. Examination at this time showed that the heart was not enlarged, the sounds being healthy, the systolic blood pressure was 125 millimetres and the diastolic 80 millimetres of mercury, while the pulse rate averaged 108 beats to the minute.

Examination of the chest revealed dulness anteriorly on the left side, and there was deficient air entry over this area. There was a friction rub lateral to the left nipple. Abdominal examination revealed nothing abnormal, no tumour being palpable; nor did examination of the other systems reveal anything abnormal. X ray examination of the chest on August 9, 1934 (Figure I), revealed "a very large opacity occupying the upper half of the left side of the thorax". The radiologist also reported that on the right side two large opacities were seen, one in the posterior mediastinum and the other extending backwards into the right upper lobe. The appearance, he thought, was almost certainly due to metastases in both lungs.

The patient was then given a daily treatment of deep X ray therapy for fourteen doses, except when week-ends intervened, the following technique being adopted: One thousand five hundred international *r* to each of four ports, two on the front and two on the back of the thorax, through 3·5 millimetres of copper and 2·0 millimetres of aluminium, at a distance of 60 centimetres and with a kilovoltage peak of 250.

He responded remarkably well, both clinically and according to radiological evidence. He was able to resume his occupation, and on September 25, 1934, the radiographer reported as follows:

> There is a remarkable improvement in the condition, and as the skiagram is taken only three weeks after the end of radiation and long before the full effect of it has been felt, one feels justified in thinking that the treatment will be successful. (See Figure II.)

It was proposed to take another skiagram a month later in order to see whether a further course of deep therapy would be required. Unfortunately we were disappointed, for the patient had to relinquish work, as he again became very short of breath and obviously much worse. He was examined again by X rays on October 15, 1934 (Figure III), and the report was: "Further marked diminution of the opacity in the upper lobe of the right lung and a slight further decrease in that near the left hilum. There is considerable congestion of both lungs, and the pleura on the left side is also much thickened and congested." The radiologist explained that at this time, eight weeks after deep therapy had been instituted, the patient would be at the height of his X ray reaction and congestion with some mediastinitis would be expected and that this would account, at least in part, for the increased breathlessness.

It was thought that the patient's symptoms would settle down, and more radiation through a small port back and front, directly over the two lesions, was proposed for

Table showing Technique.

Date.	Kilovoltage.	Distance in Centimetres.	Port 9×9 Centimetres.	Filter.	Milliampère Minutes.
25/11/31	200	50	Full	1 millimetre of copper, 1 millimetre of aluminium	35×5 1,000 *R* right hemi-abdomen (anterior)
27/11/31	200	50	Full	1 millimetre of copper, 1 millimetre of aluminium	35×5 1,000 *R* right hemi-abdomen (posterior)
30/11/31	200	50	Full	1 millimetre of copper, 1 millimetre of aluminium	35×5 1,000 *R* right hemi-abdomen (anterior)
3/12/31	200	50	Full	1 millimetre of copper, 1 millimetre of aluminium	35×5 1,000 *R* right hemi-abdomen (posterior)
5/12/31	200	50	Full	1 millimetre of copper, 1 millimetre of aluminium	35×5 1,000 *R* right hemi-abdomen (anterior)
8/12/31	200	50	Full	1 millimetre of copper, 1 millimetre of aluminium	35×5 1,000 *R* right hemi-abdomen (posterior)
11/12/31	200	50	Full	1 millimetre of copper, 1 millimetre of aluminium	35×5 1,000 *R* right hemi-abdomen (anterior)

ILLUSTRATIONS TO THE ARTICLE BY DR. ALAN B. S. OWEN.

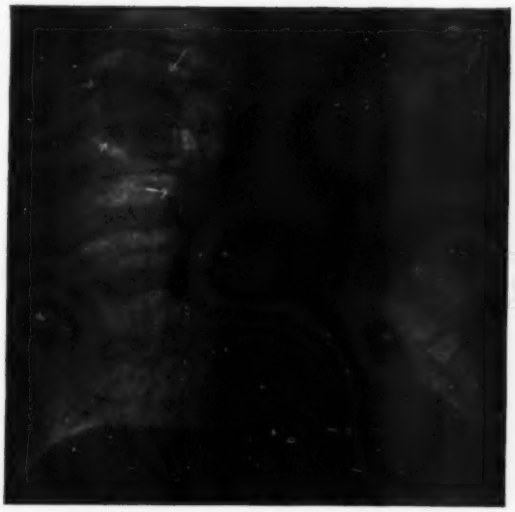

FIGURE I.

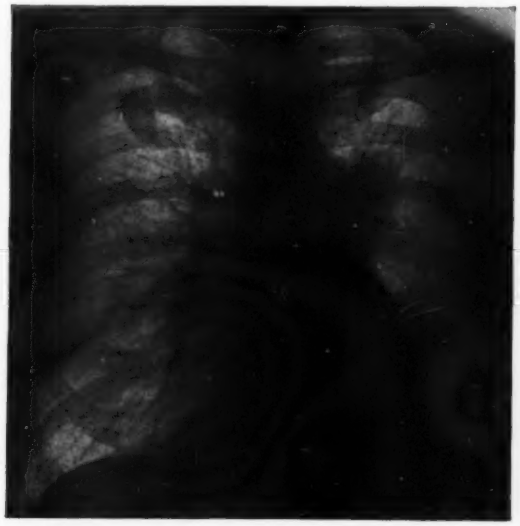

FIGURE II.

FIGURE III.

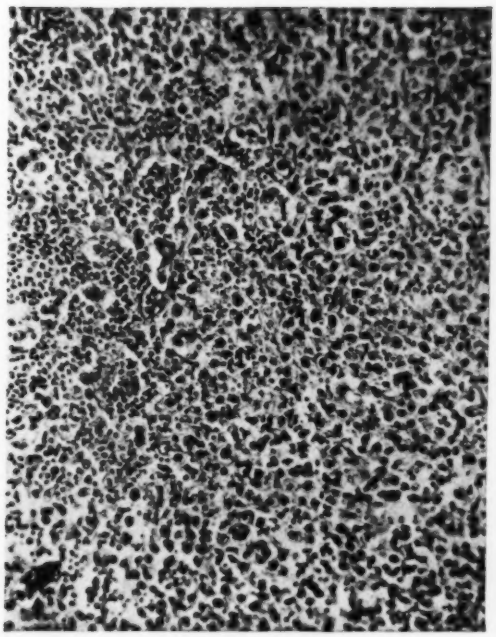

FIGURE IV.

ILLUSTRATIONS TO THE ARTICLE BY Dr. M. S. S. EARLAM.

Figure I.

Figure II.

Figure III.

four or five weeks later. His chest signs showed evidence of a good deal of congestion of both lungs and his dyspnœa greatly increased. By October 23, 1934, he was having attacks of cardiac asthma and had marked tachycardia and cyanosis. "Carbogen" failed to relieve him, and he died on October 29, 1934. There was only a slight rise in temperature occasionally during the last illness, so that there was no question of a respiratory infection.

Comment.

Pathology.

The pathological report was as follows:

Macroscopic. A spherical tumour of the testicle, three and a half inches in diameter, is covered externally by *tunica albuginea*. On bisection the tumour substance is soft and friable and ? necrotic in the centre, and it is intersected by fibrous bands.

Microscopic. The tumour consists of a dense accumulation of epithelial cells supported by a fine stroma. There is no suggestion of tubular arrangement. The epithelial cells have large vesicular but hyperchromatic nuclei with prominent nucleoli. The cytoplasm is delicate and slightly foamy, but this appearance is seen in only a few cells, since fixation has caused it to shrink and has given the cells a slightly stellate appearance. Mitotic figures can be seen in places. The stroma is very scanty, except where it is present in thick bands. Blood vessels are thin-walled. There is considerable lymphoid accumulation, but this is mainly in ill-defined clumps. The condition is one of carcinoma (seminoma) of the testis. (Figure IV.)

The age of the patient, length of history and long period before metastases appeared in the lumbar lymph glands are all typical and correspond with the description of this pathological type given by Dew.[1]

This writer has pointed out that in all the cases available for study at the time he made his observation the lumbar lymphatic glands acted as a perfectly effective barrier to the spread of the disease, so that visceral metastases were almost unknown. In this respect this type contrasts markedly with the teratomatous growths. It is of interest to surmise whether the length of survival (in this case over five years) was not the reason for the occurrence of pulmonary metastases in this case. In few of the cases recorded in the literature has this long survival period occurred, as the abdominal glandular masses usually cause death fairly rapidly if not treated by deep therapy. It may be found that as more patients are treated by deep therapy and so given a longer time for distant metastases to occur, more cases of seminoma with pulmonary metastases will be recorded. Dew, in his monograph, emphasized the necessity for radical operation in these cases, but has now (personal communication) retracted this view, believing that if the glands are invaded, it is, owing to their inaccessibility, impossible to be sure of their complete removal; and that if they are not invaded, there is no need for the operation. He however, strongly advocates immediate post-operative deep X ray radiation of the area of operation and of the lumbar lymphatic glands.

In regard to the response to deep therapy, all observers agree that the cells of this type of tumour are particularly vulnerable to deep X ray therapy, and an increasingly large number of cases are being recorded. It is, of course, suggested that this response is due to the primitive nature of the cells. In this case the response, not only of the lymphatic, but of the pulmonary metastases, was dramatic and augurs well for the prognosis in less advanced cases. The fatal issue would appear to be due to the advanced stage of the secondaries to be dealt with by X rays and the consequent flooding of the system with toxic products which overwhelmed the patient. This case would appear to throw added light on radiation of the chest for this type of very radio-sensitive growth.

It would appear that secondary growths in the abdomen can be submitted to greater X ray dosage than similar growths in the very vascular lung fields. Here the congestive reaction of X ray therapy is likely to be felt much more because it diminishes the area for effective aeration already encroached upon by the growths. In the lungs radio-sensitive tumours like the seminoma should therefore be dealt with slowly to give the patient time to deal with the products of dissolution of the growth and to minimize the effects of congestive reaction. Even in late cases X rays should be given a trial.

Summary and Conclusions.

1. A case of *seminoma testis* with successful treatment of secondaries in the abdomen by deep X ray therapy is recorded.
2. The occurrence of secondaries in the lungs five years after orchidectomy is recorded.
3. The remarkably good response of the secondaries in both regions to deep X ray therapy is noted.
4. The different conditions prevailing in thoracic new-growth as compared with the abdominal area and their relation to X ray therapy are noted.
5. Suggestions are made that promise to bring about a result comparable with that obtained with the abdominal secondaries.

Acknowledgements.

I wish to thank Dr. Cortis R. Hodgson for permission to report the case, Mr. H. R. G. Poate for the operation notes, Dr. A. T. Nisbet and Dr. P. Parkinson for the X ray reports, Dr. Davies for the pathological report, and Professor H. R. Dew for helpful advice.

Reference.

[1] Harold R. Dew: "Malignant Disease of the Testicle", 1925, page 160.

RUPTURED KIDNEY.

By M. S. S. EARLAM,

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(From the Department of Urology, Royal Prince Alfred Hospital, Sydney.)

THE case of this patient is considered worthy of detailed report on account of the difficulty in diagnosis occasioned by the fact that his history gave no definite assurance that his hæmaturia, arising as it did after an interval of five days following his injury, was necessarily the result of it. Furthermore, the findings obtained at his initial investigation pointed rather to the conclusion that the bleeding was of other origin, and it was only after relatively prolonged observation that the diagnosis was arrived at.

The patient was a male, aged forty-two years. There was nothing of note in his previous history except that he had had dental extractions on various occasions, following each of which hæmorrhage had necessitated plugging of the tooth sockets. There had been no hæmaturia prior to his injury. Fifteen days before his admission to hospital he slipped while at work and fell a distance of five feet, landing alongside a slab of rock with the sharp edge of which his left flank came into forcible contact. He felt very sore and shaken, and his medical attendant strapped his side for him. This gave him considerable ease, and he resumed work a couple of days later. Five days after the accident, while at work and feeling perfectly well, he noticed hæmaturia for the first time. He suddenly passed a large quantity of bright blood, without any associated pain or discomfort. Bleeding continued during the next seven days, at about the middle of which period he had a severe attack of left renal colic, requiring the administration of morphine. Four days before admission to hospital his hæmaturia ceased, but reappeared on the day preceding admission.

On examination the patient was of spare build and appeared healthy; nothing abnormal was detected in the abdomen or elsewhere, and the urine contained no abnormal constituents.

Cystoscopy showed a normal bladder wall and right ureteral orifice; but protruding from the left orifice was some old greyish clot. The left ureter was catheterized to the pelvis, against a little more resistance than usual. X ray examination of the urinary tract showed no abnormality, but a pyelogram of the left side (Figure I) was markedly abnormal. There was a moderate degree of hydroureter and intrarenal hydronephrosis, and the lower calyces did not fill. There were two areas of diminished opacity in the pelvis and upper major calyx, and two filling defects in the ureter, one in the region of the ureteropelvic junction and one just below the level of the transverse process of the third lumbar vertebra. The whole picture was very suggestive of newgrowth, in particular of papillomata of the pelvis and ureter; but in view of the fact that the areas of comparative transradiance might be due simply to blood clot, the examination was repeated a week later, the opportunity being also taken to investigate the right kidney, which was normal. There was again some old blood clot protruding from the left ureteral orifice. Hydronephrosis was still present on the left side (Figure II), but there were now no filling defects in the upper ureter. This time, however, the lower calyces had filled and showed marked distortion, so that the possibility of newgrowth, but now, if present, renal and not pelvic, was still existent. The patient, who now had no hæmaturia, was discharged from hospital, arrangements being made for his readmission a month later.

During the following week he had some further hæmaturia and left renal colic, but thereafter remained well. He was duly readmitted as arranged, and a pyelogram of the left side (Figure III), taken five weeks after his second examination, showed no abnormality. The conclusion was therefore reached that his symptoms and findings were the result of a traumatic lesion of the lower pole of his left kidney. There is no very obvious explanation, however, of the reason why the bleeding should not appear until five days after the injury.

Reviews.

HÆMATOLOGY.

IN recent years advances in hæmatology have been so rapid that the practitioner will welcome the excellent volume on "Disorders of the Blood", by Whitby and Britton, who worked together at the Bland Sutton Institute of Pathology at the Middlesex Hospital.[1]

They have succeeded in their object of presenting a comprehensive survey of disorders of the blood. The busy practitioner will find that the summaries in small print at the end of most chapters will greatly facilitate his reading. This feature might with advantage become a universal practice. The book is thoroughly up to date in every respect, particularly in regard to treatment.

Full details of the technique for the various examinations of the blood required in different diseases are given in the final chapter of some fifty pages. The consideration of the life history of the normal and abnormal cells of the blood is followed by a discussion of the principles and practice of hæmatological diagnosis. About one-half of the book is taken up with a survey of the anæmias, with special chapters on the anæmias of infancy and childhood and of pregnancy. Purpuric diseases, polycythæmia, the leuchæmias, affections of the spleen, the blood in infection and infectious diseases, blood transfusion and enterogenous cyanosis receive separate consideration. The subject index and the index of authors are accurate, while the print and illustrations are excellent.

When controversial matters are considered, the evidence for and against the authors' views is given in detail. Helpful tables for use in the differential diagnosis of allied conditions are scattered throughout the text.

It is difficult to find anything of importance to criticize. In the treatment of lead poisoning it is wiser to allow the lead to remain fixed in the bones than to increase its elimination and also the amount circulating in the blood by the use of potassium iodide or parathormone. This illustrates one possible fault: perhaps too much detail is given of conditions such as lead poisoning and certain tropical diseases which are not primarily blood disorders. One is not likely to refer to a text book of blood diseases for details of the treatment of such a condition as plumbism. The elimination of such details would not appreciably affect the size of the book.

This is the best British text book published to date on the very comprehensive subject of "Disorders of the Blood". It can confidently be recommended to all students, general practitioners and specialists who are interested in this important subject.

[1] "Disorders of the Blood: Diagnosis, Pathology, Treatment and Technique", by L. E. H. Whitby, C.V.O., M.C., M.A., M.D., F.R.C.P., D.P.H., and C. J. C. Britton, M.D.; 1935. London: J. and A. Churchill. Royal 8vo., pp. 551, with illustrations. Price: 21s. net.

PHYSICAL CHEMISTRY.

THE growing importance to medical students of some knowledge of physical chemistry is now generally recognized. How this knowledge may best be imparted is a question which has not yet been satisfactorily answered. During the past five years a special course of physical chemistry has been given to students at Yale Medical School as part of their course in physiology. As a result of the experience gained in this period the status of the course has been changed from regular to elective. Professor Hitchock's book presents the material on which this course is based.[1]

In attempting to compress his material within small limits the author has been forced into a rather synoptic form of treatment. The detail seems to be inadequate for the average medical student, while the scope would not satisfy the more advanced student. The excellent bibliography, however, would be very useful to the latter.

There are one or two surprising gaps in the material. In dealing with gases, for example, only perfect gases are considered. The familiar modification of Boyle's law, suggested by Van der Waals as a better approximation to the behaviour of actual gases, is not given. Similarly the treatment of solutions is practically restricted to dilute solutions and weak electrolytes. The modern extension by Debye and Hückel of the fundamental idea of the equation of Van der Waals to the behaviour of solutions of strong electrolytes merits some attempt at exposition even in an elementary text book, especially as the author warns the reader against using the uncorrected equations. The distinction between the activity and the concentration of substances in solution has its biological significance, for example, in the mechanism of the deposition of the salts of bone. In the treatment of the oxidation-reduction potential of substances in solution the symbol rH is not mentioned, although for a time it promised to become almost as common in the literature of biochemistry as the familiar pH.

The section on laboratory directions, although very short, contains carefully selected experiments, some on applications of physical chemistry to physiological processes not usually attempted in a course on physiology; yet they seem to be within the scope of the average medical student. The short biographical footnotes on eminent physical chemists are a pleasing feature. On the whole, the book is likely to be of most use to the student who has already been over the ground covered by it and who wishes quickly to revive his knowledge or to extend his reading through the bibliography.

[1] "Physical Chemistry for Students of Biology and Medicine", by D. I. Hitchcock, Ph.D.; Second Edition; 1934. Springfield: Charles C. Thomas; London: Baillière, Tindall and Cox. Royal 8vo., pp. 225, with illustrations. Price: 12s. 6d. net.

The Medical Journal of Australia

SATURDAY, NOVEMBER 16, 1935.

All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

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THE JUBILEE OF THE ADELAIDE MEDICAL SCHOOL.

THE Medical School of the University of Adelaide has celebrated its jubilee. Looking back on the history of medicine in South Australia during the last fifty years, no Australian practitioner can have anything but a feeling of pride and satisfaction in the rapid development that has taken place and in the position that the Adelaide school has created for itself in the world of medicine. At the same time no practitioner with any thought for the future will be left unmoved by the signs of further advance and the spirit of hopefulness that were so evident at the recent celebrations.

The University of Adelaide was founded by what the late Alfred Austin Lendon, in his short history of the medical school, describes as a singular act of far-seeing unselfishness. In 1872 Sir William Watson Hughes offered to Union College, a theological institution, the sum of £20,000. The directors of Union College, however, proposed that this sum should be devoted to the foundation of a university rather than to the enlargement of a denominational college, stamping themselves "as State benefactors and patriots of a high order". At the establishment of the University it was proposed that one of the chairs should be devoted to anatomy, physiology and pathology—a courageous proposition to be made at such an early stage. It was in 1881 that the suggestion of the late Edward Stirling was adopted that a lectureship in human physiology should be created in order to afford facilities for intending students of medicine and "to commence the establishment of a future school of medicine". Eventually the school was opened in 1885 with five teachers — Edward Stirling, Archibald Watson, William Henry Bragg, Edward Henry Rennie and Ralph Tate—who were destined to become eminent in their respective spheres of physiology, anatomy, physics, chemistry and natural science. With men of such character and worth the success of the school was assured; but endowments were also necessary. Dr. C. T. Champion de Crespigny, Dean of the Faculty of Medicine, in his speech at the jubilee dinner, published elsewhere in this issue, has told how public-spirited persons have from time to time given to the school endowments which have enabled successive generations of teachers and students to bring it to its present high standard.

But it is to the future that we would direct attention. Dr. de Crespigny has announced further generous gifts to the school for the foundation of an institute of medical research. The proposed institute will be a worthy and necessary addition to the edifice that was started fifty years ago. This edifice will in the nature of things scientific never be complete, for no institution connected with science can ever stand still without retrogression. Within the walls of the new institute both teachers and students will the more readily study the causation of disease. Every future graduate of the school will at least have a greater opportunity than has previously been possible of developing an inquiring mind, while those who are intellectually and temperamentally suited for such a life will be encouraged to devote their futures to research. It is to be hoped that the Government of South Australia will realize the enormous advantages that the people of the State will derive from the new institute, and that it will without delay make available a sum of money equal to or greater than that already offered by the three generous benefactors.

Current Comment.

THE TREATMENT OF SCURVY.

IT is to be hoped that Macaulay's schoolboy, that learned and repellent child, was secretly done to death by his fellow pupils; but if he still lived to enrage and confound his elders, he would now be aware that vitamin *C* is the first of that series of substances to have been prepared synthetically. In 1928, at the Hungarian University of Szeged, von Szent-Györgyi showed that the antiscorbutic properties of fresh fruits and vegetables were due to the presence of a body which he named hexuronic acid. This is now better known as ascorbic acid and has been obtained from oranges, lemons, cabbages and other forms of vegetable life, as well as from the cortex of the suprarenal gland. The acid can now be obtained commercially in tablet form. Each such tablet, as offered for therapeutic use by one firm at least, contains 0·005 gramme of ascorbic acid, the equivalent of two drachms of freshly expressed orange juice. Such preparations must prove valuable to persons, such as explorers or sailors, who may be unable to obtain an antiscorbutic diet from natural sources. Medical literature of fairly recent date, moreover, has contained encouraging accounts of the use of ascorbic acid upon scorbutic hospital patients. These have included both infants and elderly people, and a case is recorded in which a condition of capillary fragility was cured by this means.

As aforesaid, seven years have now elapsed since Szent-Györgyi isolated a crystalline body from plants and the animal adrenal cortex and called it hexuronic acid. Within the next four years other workers had corroborated his results and there was general agreement that the substance was identical with vitamin *C*. Not until two years ago did the substituted name of ascorbic acid come into vogue; and the white crystalline powder has since experienced yet a second rechristening, being now known as cevitamic acid. It has been synthesized from dextrose, and has extremely active reducing properties; it possesses the chemical formula $C_6H_8O_6$; in the white crystalline form it may be employed for intravenous injection and, in the shape of tablets, for oral administration. Twenty milligrammes of cevitamic acid are held to be equal in therapeutic effect to 15 to 20 cubic centimetres of orange juice.

An American worker, Elvira Goettsch,[1] has recently published some interesting notes upon the treatment of severe cases of infantile scurvy with cevitamic acid. She chose four infants, all seriously ill, and administered to them, by the intravenous route, the crystalline preparation of the vitamin. As controls she treated a like number of scorbutic babies with orange juice. In order that close watch might be kept of evidences of healing in the scorbutic lesions, serial X ray pictures were taken throughout the course of the observations; and the urinary excretions of two of the infants were carefully studied. By means of her serial X ray photographs, Elvira Goettsch satisfied herself that in the case of four infants receiving cevitamic acid by the intravenous method deposition of calcium in the characteristic subperiosteal hæmorrhages occurred as early as the second, third and fourth days of treatment. In the "control" patients (that is, those given orange juice therapy) the process of calcification was not observed to occur until the eighth, tenth and eleventh days. McLean and McIntosh, Goettsch states, have previously noted that these changes did not take place before the seventh day in infants recovering from scurvy. The belief is generally held that in scurvy the laying down of calcium is the necessary antecedent to cure. In six of Goettsch's cases, before therapy of any kind began, there was no radiographic evidence of subperiosteal hæmorrhage in any of the long bones. In another two slight signs of calcification could be seen. The serious condition of these two patients was a bar to the giving of any diet likely to prolong the course of the disease. In one patient an initial X ray examination clearly demonstrated calcification in periosteal hæmorrhages in the lower limbs, but none in the upper extremities. Four days after the administration of cevitamic acid a large subperiosteal hæmorrhage of the upper arm was plainly outlined by a layer of newly deposited calcium, during which time only a negligible increase in density had taken place in the hæmatomata of the legs. It may be assumed, therefore, that variations may occur in the rate of reparative calcification in the long bones of the same patient, and that the speed with which the opaque material becomes evident in X ray films may not be a certain indication of the actual rate of healing after the administration of antiscorbutic substances commences. So far as the subjective symptoms of the patients were concerned, Goettsch believes that the clinical improvement was fully as great after the use of cevitamic acid as after that of orange juice; indeed, in three of the babies given intravenous injections of the acid the pain seemed to disappear more quickly than in the controls. But in no instance was the relief of pain immediate, even after so large a dose of cevitamic acid as 400 milligrammes. No serious reaction of any sort followed the intravenous medication, even although the acid was not neutralized.

Determinations of the amount of cevitamic acid in the urine of normal children show that it is present in a concentration of 0·003 milligramme per cubic centimetre and remains constant unless excessive amounts of vitamin *C* are ingested. With the ingestion of large quantities of orange juice the urinary concentration may rise to a level ten to sixty times greater than the normal, and such concentration occurs within three hours of administration. Roughly 83% of the vitamin is excreted in the urine within three days.

Summing up, Goettsch finds that cevitamic acid, administered intravenously, has at least the same curative powers as orange juice; further, if the process of calcification be taken as a standard of cure or clinical improvement, the process comes

[1] *American Journal of Diseases of Children*, June, 1935.

about more quickly under the influence of intravenously administered cevitamic acid than by the use of orange juice. Again, no danger attaches to the employment of large intravenous doses of the acid; and the effect of one large dose is equally as curative as that of small doses spread over several days.

THE USE OF SULPHUR IN CHRONIC ARTHRITIS.

THE greatest difficulty in treatment, apart from economic considerations, is probably the suiting of a specific remedy to a specific morbid process. Even when the nature of this process is known in any given disease syndrome, an appropriate remedy is not often forthcoming. But the exact mechanism of disease is so often obscure that even this difficulty does not always arise. Examples of such gaps in our pathological knowledge may readily be multiplied, but one that is outstanding may be seen in the case of chronic arthritis. It is evident, of course, that there must be numbers of possible ætiological factors in arthritis; for example, trauma, either by cruder mechanical means or the subtler inroads of actual local infection or the toxic products of a distant infective focus, is known to produce certain more or less constant effects; so too may the less understood metabolic anomalies of a different order. There also seems to be some evidence in favour of the belief that tissue oxidation is impaired in the arthritic patient; as a basic principle this idea forms a good working hypothesis. Linked up with this let us apply what we know of the chemistry of tissue oxidation. Glutathione, a sulphur compound allied to cystine, is known to play a definite part in this function, being a hydrogen acceptor, and certain observers have found a decreased glutathione content in the blood of arthritics. The total sulphur of the blood has been reported as being raised above normal, but what is more significant is the finding that the sulphur present in the cartilages of arthritic joints is decreased. Similarly the cystine content of the finger nails is not infrequently diminished. There is also a suggestion that glutathione may have some detoxicating property, but in any case it seems reasonable to assume that there is some disturbance of the sulphur metabolism in arthritis.

These considerations have been put forward in support of the use of colloidal sulphur in rheumatoid arthritis, and a recent report of the results of such treatment is published by W. B. Rawls, B. J. Grushkin and A. A. Ressa.[1] Of course the use of sulphur is by no means new in this disease, but an attempt has been made by these writers to control their results to some extent. They used an aqueous solution of colloidal sulphur containing 10 milligrammes per cubic centimetre, and administered it in doses of 10 to 20 or even 30 milligrammes intravenously or intramuscularly twice weekly. During a control period *placebo* treatment only was given, and nothing else was done for the patients while receiving sulphur. The chief criteria of improvements were as follows: reduction of pain, swelling and stiffness, gain in weight, increase in appetite, lessening of fatigue and a reduction in the sedimentation rate of the red blood cells. The authors found that the patients tolerated the injections well; transient rashes appeared in a few cases, but the only notable toxic symptoms were fatigue and drowsiness, with some flaring up of the condition of the joints. When the cystine content of the finger nails was below the normal figures the treatment usually raised it, and these patients showed the more striking degrees of improvement. The sedimentation rate was also observed to show a more definite fall in those patients who improved, and the non-filament cell counts also were reduced. No significant effect was observed on the total red and white cell counts, though sulphur has been known to cause some interference with blood cell formation, apparently in susceptible persons.

Though colloidal sulphur is yet one more drug vaunted in the treatment of chronic arthritis, its use seems to have at least some speculative basis, and it might therefore be borne in mind in the handling of this disappointing and often intractable malady.

[1] *The American Journal of the Medical Sciences*, September, 1935.

THE SCHOOL OF VETERINARY SCIENCE IN THE UNIVERSITY OF SYDNEY.

THE October, 1935, issue of *The Australian Veterinary Journal* is a special number to commemorate the silver jubilee of the School of Veterinary Science in the University of Sydney. The silver jubilee of the School of Agriculture was celebrated at the same time as that of the School of Veterinary Science. It is fitting that the medical profession of Australia should offer congratulations to these two schools that are concerned so largely with the maintenance of the primary industries of the Commonwealth. With its sister profession of veterinary science the medical profession is more directly concerned. The School of Veterinary Science in the University of Sydney has since its inception been under the continued guidance of Professor James Douglas Stewart. In 1910 the number of students in the school was sixteen; during the years of the Great War the number on the roll fell to two; in 1935 it was one hundred and four. The graduates occupy many important positions in Australia; 70% of their number are engaged either in teaching and research or in government administrative and disease control work. In New South Wales alone thirteen veterinarians are engaged in research. This is a record of which the school may well be proud. The Glenfield Veterinary Research Station at Glenfield, New South Wales, and the McMaster Animal Health Laboratory at the University of Sydney are evidence of the importance that is attached to veterinary research. The Sydney Veterinary School has the best wishes of the medical profession in Australia.

Abstracts from Current Medical Literature.

GYNÆCOLOGY.

Amenorrhœa Associated with Bilateral Polycystic Ovaries.

IRVING F. STEIN AND MICHAEL L. LEVENTHAL (*American Journal of Obstetrics and Gynecology*, February, 1935) have investigated the relationship between amenorrhœa and bilateral polycystic ovaries. In a series of seven cases the two conditions were associated. The authors found that the pathological condition is most likely the result of hormones and not the result of inflammatory change. The diagnosis of the ovarian condition is helped by using salpingostomy associated with X ray examination. In the patients who were treated in this series, the use of the œstrogenic hormone did not give a satisfactory result. It was found to give more success if the ovaries had a wedge resection of that portion which was cystic. Every patient in whom this was done reestablished normal menstruation, and in two patients pregnancy followed. The authors are of opinion that cysts crowding close together in the cortex of the ovary interfere with the progress of the normal Graafian follicle to the surface of the ovary; and this may account for the amenorrhœa and sterility.

The Surgical Menopause after Hysterectomy and the Occurrence of Cancer in the Stump Following Subtotal Hysterectomy.

NORMAN R. KRETZSCHMAR AND SPRAGUE GARDINER (*American Journal of Obstetrics and Gynecology*, February, 1935) report on a series of *questionnaire* replies from 209 patients of thirty-six years of age and under on whom a hysterectomy, either total or subtotal, was performed. From a series of tables they show in relation to the surgical menopause: (i) That when a hysterectomy had been performed a greater proportion of women developed menopausal symptoms at an earlier age than did those who were not operated on—57·5% for subtotal and 58·3% for total hysterectomy. (ii) That the average time of the onset of hot flushes (the most instant tangible clinical evidence of menopause) is considerably delayed after subtotal hysterectomy. This would suggest that the retained uterine tissue may have some endocrine function, for the same fact holds even when both ovaries are removed. (iii) That in cases of total hysterectomy, although the onset of menopausal symptoms is quicker, the average duration of the symptoms is not shortened. (iv) That after operation for pelvic inflammation there is a high incidence of early development of menopausal symptoms, probably due to the fact that pelvic inflammation presupposes some disease of the appendages, either in whole or in part. (v) That in regard to the maintenance of the patient's sex life, a study of the tables shows that 57% of the patients who developed hot flushes show either an increase or no change in their *libido*. The second portion of the paper deals with the occurrence of cancer in the stump following subtotal hysterectomy. The author reviews a series of 1,022 cases of cervical cancer. During a period from 1902 to 1932, of this number, 18, or 1·7%, occurred in the cervical stump after operation. For benign causes, 11 of the 18 operations were performed for uterine fibroids. Among 416 patients with previous subtotal hysterectomy who replied to a *questionnaire*, one proved case of cervical cancer and five probable cases were found, an incidence of 1·44%.

Cancer of the Cervix.

F. A. MAGUIRE (*The Journal of Obstetrics and Gynæcology of the British Empire*, April, 1935) reports a series of 173 cases of cancer of the cervix between 1922 and 1933. Case histories are given of fifteen patients alive and well more than five years at the time the paper was written. The patients have been treated by various combinations of methods. Some have been treated by radium and deep X ray therapy, some by panhysterectomy, some by diathermy and radium followed by panhysterectomy, and in most of the cases since 1928 by deep X ray therapy as well. Panhysterectomy was performed on 54 patients in the series. Of these, 23 are alive and well, giving a total survival rate of 42% in all operations. There were 11 post-operative fatalities in the series, or 20%. Most of these occurred before the use of radium was adopted as a pre-operative preparation. Since this has been done in 1929 to 1933, 29 panhysterectomies have had only three post-operative fatalities, while 13 of these patients are alive and well, giving 45% survival rate to the present, over a period varying from four years to fifteen months. From 1922 to 1933 there were three post-operative fatalities, equalling 10%. Radium has been used in 85 cases since 1929. In these, 32 patients are alive and well. Of these, 27 have had deep X ray therapy in addition to the radium, while 12 have had a panhysterectomy in addition to radium and deep X ray therapy. The paper concludes with a series of tables showing the survival rates for various years up to 1933, totals per group and category, the age incidence, and the time of onset of the first definite symptoms in each group of cases.

The "Safe Period".

P. H. SCHUMACHER (*Monatsschrift für Geburtshülfe und Gynäkologie*, March, 1935) describes in detail three cases in which the theories of Ogino and Knaus regarding the premenstrual "safe period" were proved to be quite wrong. In all cases the menstrual cycle was of the regular twenty-eight day type and a careful record of the dates had been kept by the patients. In each instance pregnancy followed coitus one or two days before menstruation. The author considers that during the pre-menstrual periods there is no guarantee of absolute sterility, but only one of lessened risk of conception.

Post-Menopausal Hæmorrhage.

P. N. LOGWINSKY (*Monatsschrift für Geburtshülfe und Gynäkologie*, June, 1935) discusses the ætiology and treatment of hæmorrhage after the menopause. In a series of 79 cases he found that the most frequent cause was carcinoma of the uterus (53%) as compared with 47% for various other causes. These results point to the need for very careful investigation of all such cases to exclude malignant disease. The next most frequent causes of such hæmorrhage are fibroid polypi, hyperplastic endometritis and cervical erosions. The usual treatment is operative, and this should be deferred only because of some general condition contraindicating operation for the time being.

Therapeutics with Ovarian Hormones.

C. KAUFMANN (*The Journal of Obstetrics and Gynæcology of the British Empire*, June, 1935) illustrates the use of ovarian hormones in ovarian dysfunction. He shows that the dose of ovarian hormone necessary for substitution therapy in castrated women is much greater than hitherto imagined, 1,000,000 international units of follicular hormone being necessary to produce bleeding. In those patients who still have ovaries the condition is prone to relapse after the cessation of treatment, although in some cases the patient continues to have a normal cycle. The author found that whereas the production of a menstrual flow required large doses, the correction of vasomotor disturbance readily responded to lesser doses; vulval irritation, on the other hand, demanded more energetic treatment, but the results were very satisfying.

The Prevention of Prolapse of the Uterus and Vaginal Walls following Childbirth.

MARGARET SALMOND AND GERTRUDE DEARNLEY (*The Journal of Obstetrics and Gynæcology of the British Empire*, June, 1935) have observed a large series of patients in the out-patient department of the Royal Free Hospital, London, with special reference to patients complaining of prolapse of the uterus and vaginal walls. They find that in almost every case the symptoms are referable to injury following a confinement, while the patients are greatly handicapped in carrying out their household duties or work. Ill-health, curtailment of physical activity and often marital disharmony are the results of such injuries. If the woman is a wage-earner, the proposition is still more difficult. The authors find that a very large number of out-patients suffer from some degree of prolapse, and, in their opinion, most of these

cases are due to bad midwifery; the symptoms date, in the majority of the cases, from the first confinement. They urge increased facilities for hospital confinement in patients who are having their first baby, and improvement in the provision for adequate post-natal supervision. They consider that students and pupil midwives should have more facilities for post-graduate study and that there should be more coordination of the midwifery service between the midwife and practitioner. The problem of nutrition is one of great importance in many of these patients. The authors admit that, even if a patient is delivered under ideal conditions of a large child, or with a small pelvis, it is almost impossible to prevent vaginal lacerations and pelvic tears. They urge efficient suturing of such lacerations to avoid the occurrence of a rectocele.

OBSTETRICS.

Gonorrhœa and Pregnancy.

R. SPIEGLER AND W. HARTUNG (*Monatsschrift für Geburtshülfe und Gynäkologie*, March, 1935) have analysed in exhaustive detail the results of delivery among the gonorrhœal patients at the Seitz clinic. In 260 (1·48%) of 17,578 deliveries active gonorrhœa was present, while 280 (1·59%) women, though clinically normal, gave a history of previous infection. More than two-thirds of these women were *primiparæ* and not married. The puerperium was normal in 50·8% of the positive cases, as compared with 57·9% of the negative. More than half of the sequelæ noted were definitely due to the gonorrhœal infection. In 18% of the active cases an upward spread of infection occurred, as compared with an incidence of 7·4% of the treated cases. *Ophthalmia neonatorum* was noted in 3·8% of the infants, while 8·8% had a non-specific conjunctivitis. It was noteworthy that among the patients with active infections 9·8% had conceived and had been delivered after the original infection. When the disease had been treated previously the percentage of those becoming pregnant rose to 56·8%. The average time between infection and delivery was two years. The authors noted that in seventeen cases of definite tubal inflammation pregnancy had later ensued. Hence the need for conservative methods in treatment.

Myomectomy during Pregnancy.

F. RHEMANN (*Monatsschrift für Geburtshülfe und Gynäkologie*, June, 1935) discusses the treatment of fibroids during pregnancy. Many authors favour myomectomy, while others prefer, if possible, to defer operation until after delivery. The author gives the details of two cases in which large tumours were enucleated without disturbance of the pregnancy. He considers that operation is not needed in cases of multiple subperitoneal fibroids. Myomectomy should be performed during pregnancy in cases in which the position of the fibroid indicates probable dystocia. Cervical fibroids should be left as long as possible, because their removal generally necessitates hysterectomy. Degeneration in the fibroid during the puerperium cannot always be disregarded, for in many cases there is a prolonged convalescence. It is most important that further pregnancies should be carefully watched and that delivery should take place in hospital, because of the risk of rupture of the uterus.

Cephalic Malformation.

KHA TI LIM (*The Chinese Medical Journal*, July, 1935) makes a plea for the earlier recognition of monstrosities. Hydramnios which occurs in the second half of pregnancy suggests, apart from twins, some fœtal malformation. The absence of a normal sized head, indistinct fœtal heart sounds, and excessive fœtal movements are also suggestive of a monstrosity. Should dystocia occur without apparent cause, the presence of a monstrosity must be considered. A hydrocephalus is diagnosed by the gaping fontanelles and sutures. However, if for any of the above reasons a monstrosity is suspected, an X ray examination should be carried out in order to relieve the mother of the necessity of continuing an unfruitful pregnancy to term, with the added risk of dystocia.

The Treatment of Placenta Prævia.

S. M. KLEIN (*Monatsschrift für Geburtshülfe und Gynäkologie*, April, 1935) reviews the various methods of treatment of *placenta prævia*. He considers that hard and fast rules cannot be laid down, but that each case should be considered on its merits. In hospital practice abdominal section gives better results than the older methods of bipolar version and the use of bags. However, in domiciliary practice bipolar version is preferable in the majority of cases. The main indications for Cæsarean section are severe hæmorrhage and non-dilatation of the cervix, but the fœtus must be viable and living. The author considers that if hæmorrhage occurs after delivery the uterus should be extirpated.

Hæmorrhagic Encephalitis in Obstetric Patients.

E. D. PLASS AND E. B. WOODS (*American Journal of Obstetrics and Gynecology*, April, 1935) describe the deaths of three obstetric patients early in the course of anti-syphilitic therapy. Two of the patients were near term and one had recently been delivered. The appearance of general convulsions and a coma in two of the cases aroused suspicion of eclampsia. The *post mortem* findings gave definite evidence of hæmorrhagic encephalitis. Six injections were given in one case, totalling 2·2 grammes, and three injections totalling one gramme in each of the others. The injections were given twice a week, instead of once a week, as is the usual practice. In the first three patients three injections of 0·12 mil (two minims) of grey oil were also given. In each instance cerebral symptoms of arsenical poisoning developed within seventy-two hours of the final injection of neoarsphenamine, and death occurred within three days of the initial manifestations. From this experience and from a review of the literature the authors are of the opinion that pregnant women are very susceptible to the deleterious as well as to the beneficial effects of anti-syphilitic treatment by the modern arsenicals. This susceptibility is greatest during the first course and in latent rather than in early syphilis and in the last trimester of pregnancy.

The Prophylaxis and Treatment of Eclampsia.

J. N. WOLKOW (*Monatsschrift für Geburtshülfe und Gynäkologie*, June, 1935) maintains that the severity of eclampsia varies so greatly that comparison of figures may be highly fallacious. The degree of severity bears a close relationship to the quality of the previous antenatal supervision, which is the first and most important principle in the treatment of the condition. Of almost equal importance is the post-natal care of all eclamptics. The mortality depends not so much on the method of treatment, but more on the general condition when the patient first comes under supervision. The best method of treatment is really thorough antenatal care of all pregnant women, especially when symptoms of pre-eclampsia develop. The Stroganoff method of treatment gives the best results, and Cæsarean section has only a very limited scope.

Indications for Interference during Labour.

H. PRESSER (*Monatsschrift für Geburtshülfe und Gynäkologie*, June, 1935) reports his results with the Frey method of counting uterine contractions as a means of estimating when to interfere in labour. Frey considered that the limit of safety in the first stage lay between 100 and 175 contractions, for the second stage between 50 and 75, or for the first two stages after rupture of the membranes between 150 and 200. In his series of 400 cases the author noted that there were 46 instances in which the limits stated by Frey were exceeded without any fœtal distress. He considers that the estimation of the number of uterine contractions is no more satisfactory than that of the total length of labour as regards the prognosis in any given case. The old view that the longer the labour the greater the fœtal risk is quite true; but so far it is impossible to lay down any hard and fast rule that a certain predetermined number of contractions forms a limit which, if exceeded, will inevitably result in fœtal death.

British Medical Association News.

SCIENTIFIC.

A MEETING OF THE NEW SOUTH WALES BRANCH OF THE BRITISH MEDICAL ASSOCIATION was held at Saint Vincent's Hospital, Sydney, on September 19, 1935. The meeting took the form of a series of clinical, pathological and radiological demonstrations by members of the honorary staff. Part of the report of this meeting was published in the issue of November 9, 1935.

Thyreotoxicosis.

DR. LEILA KEATINGE showed two female patients to illustrate the amount of relief afforded in thyreotoxic goitre by X radiation following the failure of surgical treatment.

Dr. Keatinge also showed a female patient suffering from toxic adenoma of the thyreoid. This patient had an adenomatous condition for forty years, which during the previous twelve months had developed a marked degree of toxicity. She had never consulted a doctor for the adenoma, but became very worried when the toxic signs and symptoms appeared. X radiation was given, and the tumour was reduced considerably in size. The circumference of the neck became 5·0 centimetres (two inches) less and all toxic signs and symptoms disappeared. Dr. Keatinge said that the case illustrated the use of X radiation prior to surgery.

Dr. Keatinge's fourth patient was a male, aged twenty years, whose basal metabolic rate had been +68. It was considered inadvisable to operate on him. He had had all the signs and symptoms of thyreotoxicosis very profoundly and the pulse rate at times had been uncountable. X radiation had been given and he was now back at work apparently cured.

DR. V. J. KINSELLA showed a female patient, aged forty-two years, who had been taking iodine for two years on lay advice prior to her admission to hospital. Her symptoms had improved for a time. Finally she was forced to attend hospital on account of weakness, amounting to collapse; sweating; severe dyspnœa with cyanosis; auricular fibrillation, with a pulse rate of 160 per minute; signs of myocardial degeneration.

At operation on July 11, 1935, thyreoidectomy was performed, leaving only the posterior borders of the lateral lobes. Two days later the patient began to have hallucinations; she became drowsy, and lost her appetite; her pulse rate fell to 50 per minute, and her skin became pale, puffy and glossy. The symptoms immediately subsided when thyreoid extract, in a dose of 0·12 gramme (two grains) a day, was given. This was discontinued after five days. As a result of the operation, the patient's general well-being had markedly improved; the severe dyspnœa, lividity and sweating had disappeared; the exophthalmos had lessened, but was still pronounced. Dr. Kinsella thought it was likely to persist, being due to increased retrobulbar fat. The patient still suffered from auricular fibrillation and myocardial damage. She had not taken digitalis since leaving hospital.

Persistent Thyreoglossal Duct.

DR. V. J. KINSELLA showed a microscopic section of a thyreoglossal duct that he had recently removed from a child, aged four years, by Sistrinunk's method. Dr. Kinsella said that the object of showing the slide was to show the multiple cavities lined by cubical epithelium; these must represent diverticula or tortuosities of the main tract. He said that this explained the tendency to recurrence.

Thyreoglossal Fistula.

Dr. Kinsella also showed a male patient, aged twenty-one years, who had had an abscess in the front of the neck soon after birth. This had broken down and had been discharging ever since. The discharge was mucoid and slight in quantity; but it soiled the patient's collar. Examination showed a thyreoglossal fistula. X ray examination of the fistula after the injection of lipiodol showed it to be complete. The patient felt the lipiodol in his mouth as soon as it was injected. Dr. Kinsella remarked that a complete thyreoglossal fistula was very rare. He quoted Crile as saying: "There is no authentic case on record of the duct persisting as a patent channel throughout, from the *foramen caecum* above to the fistulous opening in the neck below."

Retrosternal Goitre.

Dr. Kinsella's next patient was a woman, aged forty-nine years, who had suffered from bronchiectasis for some years and had received medical treatment. She had had a cough since birth and had been husky for years. She had feelings of suffocating at night and dyspnœa. Examination showed a goitre with retrosternal extension, and distended pulsating external jugular veins. X ray examination showed tracheal compression by a retrosternal goitre. Operation, consisting in removal of the left lobe of the thyreoid gland and the retrosternal extension, was performed six months before the meeting. As a result the attacks of suffocation had disappeared, the dyspnœa had lessened, and coughing and expectoration had decreased.

Epithelioma of the Tongue.

Dr. Kinsella also showed a woman, aged thirty-four years, who had had a sore tongue for two years before admission to hospital. The condition had commenced as a glossitis of specific origin. Examination revealed the whole tongue affected by chronic superficial glossitis, deep scarring, and a large epithelioma on the left border spreading to the floor of the mouth almost to the mandible. Operation in October, 1934, consisted in removal of the left side of the tongue and the adjoining segment of the mandible, and block dissection of the lymphatic glands on the same side. Pathological examination revealed that the tumour was a grossly malignant epithelioma; the cells were of an anaplastic type. In June, 1935, radium needling of the glossitic plaque on the remaining side of the tongue was employed. The patient had good free movement in the jaw and, owing to the splinting methods used, Dr. Kinsella said that it was possible now to get good occlusion of the teeth. This would be maintained when a graft was implanted later.

Fat Necrosis.

Dr. Kinsella's next patient was a woman, aged fifty-three years, who had suffered from pain in the right breast for two months and had noticed a lump in the same breast for three weeks prior to admission to hospital. At the time of admission there was a tiny mass in the right breast, in the upper and outer quadrant. Dr. Miller had seen the patient at the outdoor department and had detected very slight but definite skin fixation and dimpling over the area. Operation was performed on August 27, 1935. The mass was removed by an elliptical incision, which included skin and tissues right down to the pectoral muscles. The mass was then incised and was seen to be a well defined firm white mass with a central area of liquefaction. Microscopic examination revealed the presence of multinucleated giant cells and foam cells, and infiltration with small cells, lymphocytes, plasma cells and fibroblasts.

Fascial Grafting.

Dr. Kinsella also showed two patients on whom he had operated for large herniæ. The first patient had had a large incisional hernia following three abdominal operations that had been performed some years previously. The second patient had had a large femoral hernia. *Fascia lata* was employed in the repair in each case. In one case the *fascia lata* was obtained by means of a long incision in the thigh; in the other, through a small incision by means of a specially designed fasciatome.

Deformity of the Little Toe.

DR. D. J. GLISSAN showed skiagrams illustrating the existence of a deformity of the little toe analogous in all respects to *hallux valgus*. He pointed out that the essential feature of practically all cases of *hallux valgus* was a varoid inclination of the first metatarsal bone. In the cases demonstrated it was seen that the little toe was inclined towards the mid-line of the foot in response to a valgoid inclination of the fifth metatarsal. In many cases the deformity gave rise to no subjective symptoms; but in some complaint was made of pain about the lateral aspect of the head of the fifth metatarsal. In some cases there were thickened and reddened skin and pronounced swelling in this region. Treatment in severe cases called for osteotomy of the shaft of the metatarsal near its base and removal of the first phalanx of the toe.

A Rare Foot Injury.

Dr. Glissan also showed a young man who had complained of pain about the forefoot following two slight twisting injuries, one of which was sustained whilst descending a stairway. On examination there was found definite slight swelling over the region of the medial and second cuneiform bones. There was no tenderness at any other site in the foot. The skiagram showed, as compared with one of the unaffected foot, that a definite separation had taken place between the first and second cuneiform bones. The gap was wider proximally than distally. Firm strapping about the affected area and the application of strapping to hold the foot in a varoid relation to the leg gave immediate relief, which was permanent.

Dr. Glissan pointed out that the absence of any sign indicative of strain or tear of the section of the transverse metatarsal ligament between the great and second metatarsal bones and the greater width of separation at the proximal end of the articulation were evidently due to the subluxating force having been applied proximo-distally. In all probability the hind part of the foot had been thrust heavily on the fixed forefoot, and the scaphoid bone, acting as a wedge, had forced apart the hind end of the articulation between the affected cuneiform bones.

A Rare Hip Injury.

Dr. Glissan's next patient was a boy, aged twelve years, who had attended hospital seeking relief of pain in the right hip. He was an overgrown lad and showed indisputable evidence of the presence of the Fröhlich type of adeno-hypophyseal dystrophy. He gave a history of a fall off a cycle some ten days previously, following which he had not been able to walk, except with a crutch, and had suffered great pain. On examination the lower limb was seen to be fixed in right-angled flexion, adduction and internal rotation at the hip joint, and any attempt to move the limb caused very severe pain. A clinical diagnosis was made of unreduced posterior dislocation at the hip joint, and the lad was admitted to hospital. A skiagram showed what was apparently a typical slipping of the upper femoral epiphysis. However, in view of the atypical position of the lower limb, this diagnosis was not accepted, and stereoscopic skiagrams were asked for. These showed that the neck of the femur was lying in a complete posterior relationship with the epiphysis, which, though much rotated so that its raw surface pointed backwards, was still in the acetabulum. It was clear that at the time of his fall the lower limb had performed the manœuvre necessary to produce a posterior dislocation, but the epiphysis had remained in the acetabulum, whilst the stump of the neck had continued its course to become jammed between the epiphysis and the posterior capsule. Treatment to overcome the displacement was commenced. For a week the limb was pulled upon in the line of the deformity, by weight extension with the knee flexed, without any improvement. An anæsthetic was then administered and the patient was placed upon his back on the floor and, whilst the pelvis was steadied by an assistant, steady, strong traction was made on the flexed thigh. This produced no change, and a similar manœuvre, but with the knee extended, was then carried out. This seemed to result in some lengthening of the limb, and it was determined to apply weight extension in this position with the patient in bed. The only effect of this form of traction was to cause great pain and the development of a compression neuritis of the peroneal division of the sciatic nerve. After consideration it was decided that to relieve pain, to prevent gross deformity and to restore the maximum amount of function it would be necessary to remove the epiphysis and place the stump of the femoral neck in the acetabulum.

At operation the stereoscopic radiographic findings were completely substantiated. The epiphysis completely overlay the neck of the femur in front and was so rotated that its raw surface was pressed hard against the anterior aspect of the neck. It was necessary to remove the epiphysis piecemeal, so firmly was it jammed against the femur. When the acetabulum was emptied it was seen that the soft stump of the femoral neck was resting firmly upon the posterior edge of the acetabulum, and to dislodge it it was necessary to manœuvre the bone sharply forward under traction.

At the time of the meeting, some three months after operation, the boy was able to walk comparatively well and could flex his thigh to a right angle at the hip joint. A skiagram showed that the upper end of the neck had become rounded in conformity with the shape of the acetabulum. He had a good deal of shortening, which, as it increased, would probably call for lengthening of the femur at a later date.

Arthroplasty of the Elbow.

Dr. Glissan also showed a young man whose left upper limb had been badly lacerated some three years previously by some farming machinery. It had been necessary to amputate through the upper third of the forearm. This patient had presented himself because the elbow joint had become ankylosed by bone at about 45° short of full extension, so that the upper part of the limb was comparatively useless and no form of prosthesis was of any avail. It was decided to carry out the operation of arthroplasty at the elbow in order to increase the efficiency of such simple forms of prostheses as might be suitable for him. The operation was performed some three months before the meeting. At the time of the meeting the patient could move the limb strongly to a right angle and could extend the stump to within about 20° of full extension, and his range was slowly increasing.

Ununited Fractures.

Dr. Glissan's next patient was a seaman, aged about forty years, who, in May, 1928, had sustained a fracture of both malleoli of the left ankle. He had been treated for less than a week in a Sydney hospital, whence he was returned to England. Here he was treated apparently with radiant heat and massage, but returned to Australia in 1930 with his fractures still ununited and with severe disablement.

He was admitted to Saint Vincent's Hospital on May 1, 1930. Skiagrams taken on May 4 showed the fractures still ununited. On May 14 of the same year, following the clearing away of the interposed scar tissue and freshening of the bone ends, a massive bone peg was passed in the case of each malleolus through a hole drilled through each process into the parent bone. In the case of the lateral side of the ankle the graft was misdirected and pierced the shaft of the fibula a little distance above the site of fracture; but since it held the malleolus in position and caused no obvious trouble, no attempt was made to cut away the protruding fragment of the graft.

The patient subsequently returned to England, but reported to Dr. Glissan again when the opportunity offered early in September, 1935. He had no clinical evidence of any disability of any kind at the ankle joint, and the skiagrams taken at this time disclosed certain points of interest. Each malleolus was solidly united in good position, and the astragalus and foot were in completely normal relationship with the leg bones. The shadow of each graft, or, rather, the remainder of each, was still

clearly visible, including that portion of the lateral graft which projected through the shaft of the fibula and passed into the soft tissues behind the tibia. There was a good deal of osteoarthritic change about the joint, which, as stated, was functioning perfectly normally.

Hallux Rigidus.

Dr. Glissan's last patient was shown to illustrate his method of dealing with *hallux rigidus* by inducing bony ankylosis at the metatarso-phalangeal joint, with the proximal phalanx fixed at a selected angle with the metatarsal bone. Dr. Glissan said that this operation and its rationale would be the subject of a detailed report later.

Radiological Demonstrations.

DR. D. G. MAITLAND showed a series of skiagrams showing the appearances observed in the following disorders: Tuberculosis of the lungs in varying stages; a miliary tuberculosis contrasted with silicosis of the lungs; osteogenic sarcoma of the right shoulder; ossifying fibroma of the thigh; polycystic disease of the kidney; *osteochondritis dissecans* of the knee joint; disease of the gall-bladder; a fish-hook in the bulb of the urethra.

DR. B. P. ANDERSON STUART showed a number of skiagrams illustrating the use of "Thorotrast" in visualizing the liver and spleen. "Thorotrast" was injected intravenously, and the thorium dioxide, a colloidal material of high atomic weight, was taken up by the reticulo-endothelial cells and thus allowed of radiographic visualization of those organs containing the greatest number of these cells—the liver and the spleen. Dr. Anderson Stuart stated that the average dose was from twenty to twenty-five cubic centimetres daily for three doses. About twenty-four hours after the first injection the density of the shadows of the liver and spleen was found to be increased on the X ray films. Subsequently it increased greatly and reached a maximum in about four days. The liver and spleen in a normal patient should cast a shadow as dense as that of the ribs. The outlines of the spleen and of the liver, including any accessory lobes, could be clearly seen, and these organs could be differentiated from other abdominal masses. In metastatic malignant disease of the liver, when the metastases were large, they could be seen as transradiant areas within the denser shadow of the liver.

Pathological Specimens.

DR. A. H. TEBBUTT gave a demonstration of pathological specimens illustrating pre-cancerous and cancerous conditions of the breast, cancer of the stomach and intestine, and chorionic cancer.

SCHOLARSHIPS AND GRANTS IN AID OF SCIENTIFIC RESEARCH.

Scholarships.

THE Council of the British Medical Association is prepared to receive applications for research scholarships as follows: an Ernest Hart Memorial Scholarship, of the value of £200 *per annum*; a Walter Dixon Scholarship, of the value of £200 *per annum*; three research scholarships each of the value of £150 *per annum*.

These scholarships are given to candidates whom the Science Committee of the Association recommends as qualified to undertake research in any subject (including state medicine) relating to the causation, prevention or treatment of disease.

Each scholarship is tenable for one year, commencing on October 1, 1936. A scholar may be reappointed for not more than two additional terms. A scholar is not necessarily required to devote the whole of his or her time to the work of research, but may hold a junior appointment at a university, medical school or hospital, provided the duties of such appointment do not interfere with his or her work as a scholar.

Grants.

The Council of the British Medical Association is also prepared to receive applications for grants for the assistance of research into the causation, treatment or prevention of disease. Preference will be given, other things being equal, to members of the medical profession and to applicants who propose as subjects of investigation problems directly related to practical medicine.

Conditions of Award: Applications.

A copy of the regulations relative to the award of the scholarships and grants for 1936, and of the prescribed application form can be obtained on application to the Secretary of the Federal Council of the British Medical Association in Australia, British Medical Association House, 135, Macquarie Street, Sydney. The completed application form is required to be submitted to the Secretary of the Federal Council not later than March 2, 1936.

Applicants are required to furnish the names of three referees who are competent to speak as to their capacity for the research contemplated, to whom reference may be made.

Medical Societies.

THE MELBOURNE PÆDIATRIC SOCIETY.

A MEETING OF THE MELBOURNE PÆDIATRIC SOCIETY was held at the Children's Hospital, Carlton, on July 10, 1935, DR. J. G. WHITAKER, the President, in the chair. The meeting took the form of a series of clinical demonstrations.

Subdural Hæmorrhage.

DR. H. BOYD GRAHAM showed a baby aged three months. He was the first child of healthy parents and was said to be ten days post-mature. After a long confinement he was delivered by forceps and at birth weighed 3·8 kilograms (eight and a half pounds). The forceps made a mark near the outer canthus of the right eye, but no other marks were noticed. Except that the baby was a little drowsy, he seemed to progress well until the sixth day, when he became more drowsy and refused the breast. During that day and the next he became unable to drink and was progressively more lethargic and feeble. At that stage Dr. Graham saw him. The baby was very difficult to rouse, the anterior fontanelle was tense and the right forearm and hand were œdematous and rubbery. The left upper eyelid was œdematous and the left eye was more difficult to open that the right. The left pupil was dilated and fixed, the right pupil was contracted. The optic disk on the left side was very white. The legs were not spastic, the knee joints seemed normal and there was no neck stiffness. On lumbar puncture, the cerebro-spinal fluid was under reduced pressure and it was clear but straw coloured. Dr. Graham thought on the evidence that the baby had a left parietal extracerebral hæmorrhage, probably subdural, and with a cone of pressure threatening the centres of the medulla. He thought that non-interference would mean either the death of the baby or, if it survived, paralysis of the arm and probably mental deficiency.

The father agreed to operation, and under local anæsthesia Dr. Littlejohn had exposed and removed the hæmorrhage. When the bone was removed over the parietal area a bluish-red discoloration was observed under the dura and, on incising the dura, recent blood clot welled up under pressure. As much as possible was removed and the remainder was washed out with saline solution. The cortex herniated to such a degree that it was decided not to replace the bone. The baby stood the operation well and on the following day was less drowsy and could swallow breast milk from a pipette. Glucose and saline solution were given and already the right arm was very much improved.

Four days later the baby was much improved. It was fed with breast milk intranasally and extra fluid was given as well. The hand was still improving, but the pupils were unaltered. There was considerable herniation of the brain into the wound. The following day nystagmus was noted with the quick component to the left. The left internal rectus muscle was paralyzed. Both optic disks were pale, the left being paler than the right. By the eleventh day the baby could take the breast to a certain extent, and expressed breast milk was given by bottle to make a three and a half ounce feeding seven times a day. When the baby left hospital one fortnight later the wound was healed, though there was still some herniation of the brain. The right arm now seemed quite normal, but the ptosis of the left upper lid was still apparent and the left pupil was dilated. The baby had since progressed remarkably well. Dr. Mark Gardiner examined the optic disks and described the condition as one of optic atrophy secondary to papilloedema with both disks a little pale, the left disk more so than the right. As the pressure had been removed so early he thought the prognosis as to the sight would be good.

As evidence of the mental development of the baby it was stated that though the baby was not yet three months old, he could hold his head up and had been trained not to soil his diapers either by micturition or defæcation.

Dr. Graham thought this patient's case was of importance as an indication to those who had not adopted the policy of prompt operative interference in birth hæmorrhages that they should give it serious consideration. Here was a baby who would either have died or survived to be a cripple, whereas now his future was bright.

Streptococcal Arthritis.

DR. ERIC PRICE showed a boy of six years admitted to hospital with a history of pain in the left knee for the previous four days. Six days before the onset of illness his tonsils had been removed. The day after his admission to hospital his knee was aspirated, and a culture yielded streptococci. The lower end of the femur was aspirated, but nothing abnormal was found, and a culture from the bone was sterile. The joint was treated conservatively by aspiration and lavage with acriflavine, but in three days it discharged spontaneously through the lateral incision. The knee then did very well for a month and a splint was ordered preparatory to the child's going home. Six weeks after the patient's admission to hospital and four weeks after the last operation his temperature began to rise and the knee again became very tender. It was again explored, but nothing was found. Two days later a blood transfusion was attempted, but after only one ounce had been injected from the same donor as on a previous occasion the patient had a severe reaction consisting of abdominal pain and dyspnœa. It was thought that he had a pulmonary infarct, but he had no cough nor hæmoptysis and no signs in his chest for a week, during which time he remained febrile. At the end of this week abnormal physical signs were audible high in the right axilla. A radiogram at this time showed a wedge-shaped area of consolidation in the middle zone of the right lung which was thought to be an infarct, and above this an area of resolving consolidation. Ten days later another radiogram revealed a cavity with a fluid level. The patient remained febrile until one day when, after thirty-two days of fever, he coughed up a cupful of rusty, purulent, foul sputum and his temperature immediately fell and remained down. The most recent X ray examination had shown that a cavity was still present, but there was no cough or expectoration even with the postural treatment.

Dr. Price said that he showed the patient first of all because an apparently primary streptococcal arthritis was rare. Secondly, the origin of the abscess in the lung was obscure. It might have followed the tonsillectomy, but the interval of seven weeks made this doubtful. It might have been embolic from the joint, but this had been quiescent for a month. It might have been embolic from the transfusion, but he had no hæmoptysis and symptoms were present before the blood was actually given.

Antitoxin in Meningitis.

DR. A. P. DERHAM showed a baby, aged seven months, admitted to hospital with a history that it had been feverish and irritable for five days. It had been sleepless and its eyes were rolling around aimlessly. There was no vomiting or diarrhœa and it took the breast quite well. Examination revealed a very irritable baby with a temperature of 39·4° C. (103° F.). There was definite neck stiffness and Kernig's sign was present. On lumbar puncture turbid fluid was removed under increased pressure, and examination of a smear revealed many polymorphonuclear cells and Gram-negative diplococci resembling meningococci. There was no growth on culture. Thirty cubic centimetres of meningococcal antitoxin (Parke, Davis and Company) were given by the intramuscular route on two successive days, and then three injections of the same quantity were given intravenously through the fontanelle on alternate days. Lumbar puncture at this stage showed that the fluid was still under increased pressure and still quite turbid. There were 2,000 polymorphonuclear cells per cubic millimetre and meningococci were still present. Another thirty cubic centimetres were given via the fontanelle. From then on the condition of the baby began to improve. At the time of the meeting there was still some neck stiffness and still a slight Kernig's sign, but the temperature was normal and, although the baby had lost 1·3 kilograms (three pounds) in weight, he was now eating well and gaining.

Dr. Derham showed the baby because it was the first patient at the hospital to be treated with antitoxin instead of antimeningococcal serum. Ferry had first published some experimental work in 1933, but the first clinical trial had been made by Dr. Banks, who described his method and his results in *The Lancet* of April 13, 1935. He had given a comparison of the two methods and thought that the more recent one was the more favourable. Dr. Derham said that no conclusions could be drawn from this one case, but the patient did not seem to have responded better than he would have responded with the older antimeningococcal serum therapy.

University Intelligence.

THE UNIVERSITY OF ADELAIDE.

JUBILEE CELEBRATIONS OF THE MEDICAL SCHOOL.

THE jubilee celebrations of the foundation of the Medical School of the University of Adelaide were opened with a conversazione on Friday, August 30, 1935, which took the form of an exhibition displaying the progress of medicine in the past fifty years.

The conversazione was open for four sessions in the afternoons and evenings of August 30 and 31. The opening session was by invitation and the other sessions were open to the public. His Excellency the Governor of South Australia, Sir Winston Duggan, attended by Commander Phillips, was present at the opening session. His Excellency was received by Sir William Mitchell, Vice-Chancellor of the University of Adelaide, Dr. C. T. Champion de Crespigny, Dean of the Faculty of Medicine, and the two medical secretaries, Professor H. J. Wilkinson and Dr. K. Stuart Hetzel. Three of the four medical students who began their studies in 1885 are still living, and two of these, Dr. F. Goldsmith and Dr. C. H. S. Hope, were presented to His Excellency the Governor. The other two foundation students were Dr. C. Magarey and the late Dr. A. F. A. Lynch.

The exhibition was housed at the University and was divided into various sections and specialties. The Section of Medicine showed the development of various tests and methods of examination for gastric and renal function, methods of examination of the circulation of the blood, and of the brain and central nervous system. The dis-

covery of the functions of the internal secreting glands and vitamins was depicted in pictorial form. The discovery of the ætiological factors in tropical diseases and the methods of control of these diseases were exemplified. The Section for Diseases of the Skin demonstrated advances in the methods of treatment. Diseases of the lungs and modern methods in diagnosis and treatment were stressed.

The advance in surgical methods was shown by the exhibition of a modern operating theatre as contrasted with an old one of fifty years ago. An exhibition with puppets depicting the methods of giving fluids and blood for the treatment of shock evinced much interest. The various stages in the development of modern treatment of fracture were shown by means of models.

The Physiological Department demonstrated perfusion of the heart, the action and standardization of drugs on living tissues and certain aspects of respiration.

The Biochemical Department staged an excellent display of foodstuffs in common use, with their calorie and vitamin contents shown in graphic form.

The Anatomical and Pathological Museums were open during the exhibition and attracted much attention. Blood grouping, vectors in disease, bacteria, cultural methods *et cetera* were exhibited by the Section of Pathology and Bacteriology. The Department of Medical Zoology showed parasites of human beings and common Australian snakes.

The Public Health and Preventive Medicine Section included in its display modern domestic and military hygiene and local board of health methods. Modern infant welfare was contrasted with that in existence fifty years ago.

The X Ray Section demonstrated the evolution of X ray tubes and equipment to those of modern times. Advances in anæsthesia were shown by an exhibition of old and modern appliances, and the Section of Pharmacy gave an extensive exhibit of modern methods of refining and standardization of drugs. Exhibits of an historical and literary interest were shown, as well as photographs in connexion with the development of the school. The Section of Eye, Ear, Nose and Throat Diseases demonstrated the advances in treatment and showed modern equipment.

Cinematograph films of medical interest were shown at intervals at all of the sessions. The buildings were crowded at all times, and it was most gratifying to those responsible for the exhibition that the general public evinced so much interest in the display.

A Special Congregation.

A special congregation of the University of Adelaide was held on September 18, 1935, in connexion with the jubilee of the Medical School. Sir William Mitchell, the Vice-Chancellor, presided, and His Excellency Sir Winston Duggan, Governor of South Australia, was present.

In his opening address Sir William Mitchell paid a tribute to the founders of the Medical School. He referred to the progress made during the previous fifteen years, and made special reference to the financial assistance given by the Government of South Australia. He said that an additional sum of £20,000 *per annum* had been made available to the medical school. This assistance had been very valuable. It had not checked private endowments in any way; on the contrary, bequests had been more than twice as great as during the preceding period of thirty-five years. He looked on what had been done as a very good beginning. It was not sufficient that the schools within a university should keep abreast of the advances in science and practice. They had to make knowledge, not merely to spread it. Adelaide had opportunities of making additions to knowledge, both in medicine and the other sciences. Sir William Mitchell then referred to a short history of the Medical School written by the late Dr. A. A. Lendon and published in connexion with the jubilee. This publication, though short, was an interesting and important document; it was edited and revised by Dr. William Ray. Sir William Mitchell made reference to the remarkable influence of the late Sir Joseph Verco on medical thought and education in South Australia.

Conferring of Honorary Degrees.

Sir William Mitchell admitted to the degree of Doctor of Medicine (*ad eundem gradum*) the Right Honourable Lord Horder, K.C.V.O., and Sir Thomas Dunhill, K.C.V.O.

Address by Lord Horder.

Lord Horder delivered an address in which he made a special plea for the establishment of an institute of medical research. He expressed admiration for the standard of hospital service and culture that he had found in Adelaide. He had been told of the efforts that were being made to extend the field of medical research, and understood that the wealth of clinical and pathological material would be used not only for teaching purposes, but for the advancement of medical science. An institute of medical research would knit together hospital services and clinical and pathological investigations as nothing else could do. He assumed that in such an institute there would be a department in which clinical and pathological investigations were analysed and correlated; there would be another in which material obtained *post mortem* would be submitted to intensive study; in another, public health aspects of medicine would be studied; and in another research would be undertaken by the staff and by senior students. He had no doubt that all concerned would work together towards the attainment of their objective. Lord Horder referred to the great names among the teachers of the Adelaide School, and said that the traditions of the medical profession were shared equally by young and old medical schools. There was an enormous amount of available clinical material; there might be a wastage rather than a shortage. The Adelaide Hospital was so well adapted to its needs that its future was assured.

Lord Horder thought that the medical curriculum was in need of revision. More attention should be devoted to genetics, psychology and dietetics, and preclinical studies should be more closely adapted to the needs of the young practitioner. The close association of academic teaching with clinical work was most important; Adelaide was fortunate in having exceptional advantages from this point of view.

The Jubilee Dinner.

A dinner in celebration of the jubilee was held on the evening of September 18, 1935, at the University Refectory. Sir William Mitchell, Vice-Chancellor of the University of Adelaide, occupied the chair.

After the toast of "His Majesty the King" had been honoured, the toast of "The Medical School" was proposed by His Honour Mr. Justice Angas Parsons, Acting Chief Justice of South Australia.

Dr. C. T. Champion de Crespigny, the Dean of the Faculty of Medicine, in replying to the toast, said that if the founders of the school could be with them, he believed that they would have cause to be satisfied with the results of their labours. Those who were gathered to celebrate the fiftieth anniversary should remember the founders.

On referring to the University Calendar, Dr. de Crespigny found that the benefactions to the school contributed by the generosity of citizens of South Australia amounted altogether to over £104,000.

In 1882 Sir Thomas Elder gave £10,000 towards the foundation of a medical school, and in 1897 £20,000 more. In 1884 £6,000 was given for the foundation of a chair in chemistry by the Honourable J. W. Angas. The family of the late John Darling had contributed £15,000 in 1920 to perpetuate the memory of their father. This made possible the erection of the Darling Building, which housed the departments of zoology, physiology, biochemistry and pathology. In 1922 Mrs. Jane Marks had given £30,000 to the Medical School in memory of George Richard Marks and his wife, Jane Marks, while in the same year, for the advancement of medical research, Mrs. A. M. Simpson and Miss A. F. Keith Sheridan had made over to the University property to the value of £20,000. Valuable scholarships had been endowed by the late Dr. Everard, Mrs. Davies Thomas and the executors of the late Mrs. A. M. Simpson and Miss Keith Sheridan. The Government of South Australia, recognizing the importance and value

of a school of medicine, had constantly contributed to its support.

The school was happy in having had from its very beginning on its teaching staff men of character, wisdom and enthusiasm, some of whom had reached world-wide renown. Professor Bragg had occupied the chair of physics—his earliest work in the X ray analysis of crystals and other studies in radio-activity had been carried out at the University of Adelaide; the radium which he had used was the gift of the late Mr. Barr Smith. Professor Rennie, who had occupied the chair in chemistry, was a scientist of the highest order; he would be remembered with respect and affection by the students who had been privileged to be taught by him. In his memory the fine theatre in the new Department of Chemistry was named.

To Sir Edward Stirling, at first Lecturer in and then Professor of Physiology, Dr. de Crespigny believed was to be attributed the conception of establishing a school of medicine in Adelaide. He was too well remembered for Dr. de Crespigny to speak of his qualities. He was the first on the teaching staff to be made a Fellow of the Royal Society whilst in the University.

Professor Archibald Watson had become a tradition. One of the greatest living surgical anatomists, his personality was even more remarkable than his learning. Whenever two or more of his old students met together one could be sure that the newest or oldest story about "Wattie" would be told or retold. Still as alert and nearly as active as ever, he had recently caught two enormous fish before breakfast in some remote corner of the Pacific.

Sir Joseph Verco as a physician and teacher of medicine would be remembered as long as the highest qualities in the medical profession were honoured. The school had never had a wiser or better friend. His interests and endeavours had lain not only in his own profession. The Royal Society of South Australia, of which he was for many years president, owed much to his fostering interest and care. By his gift to the University in 1926 of £5,000 the publication of *The Australian Journal of Experimental Biology and Medical Science* had been made possible.

But it was not by the generosity of its founders, nor by the protecting care of the State, nor by the eminence of its teachers, nor yet by the number of its students that a school of medicine might prove its worth. By the men that it had trained it had to be judged. By the audience present, Dr. de Crespigny feared that such a judgement might not be unbiased. Yet he believed that even a critical and impartial observer would say that the school had succeeded. It had tried to fit men and women to practise their profession in conditions such as existed in Australia. The course, originally five years, had since the War been lengthened to six years. During that time students received instruction in all those branches of medical science necessary to fit them for general practice; and it had to be remembered that in many remote country districts they had to do their work without the possibility of assistance from medical colleagues. Therefore they had to be practical and capable, and Dr. de Crespigny had confidence in saying, after twenty-six years of experience of him, that the average graduate from the Adelaide school was a well trained and self-reliant person.

Adelaide graduates had proved themselves to be so during the Great War, and those present should remember with pride how large a number had served; and they should mourn, but with even greater pride, those who had not returned.

Dr. de Crespigny had mentioned as the type the men in general practice, for it was they who did the bulk of the work and who had to maintain the efficiency and dignity of the profession.

On the teaching staff of the University, in the clinical subjects, and in the honorary staffs of teaching hospitals, Adelaide graduates now formed by far the greater proportion. There was reason for gratification that graduates from the school had not been without distinction in the Old Country (home, as Australians still called it). To mention but a few: Hugh Cairns was on the staff of the London Hospital and had won renown as a neurological surgeon. Howard Florey held the Chair of Pathology in Oxford. Aubrey Lewis was an able psychiatrist on the staff of the Maudsley Hospital. Mr. Meucke, Dr. de Crespigny would merely mention, as he was present—his modesty had to be considered.

In the nineties clinical instruction in the medical course had ceased for a few years. During those years Adelaide undergraduates had had to complete their course in Melbourne and Sydney, where many had gained eminence. One of them was their own Professor Cleland, now happily restored to them. Dr. Bickerton Blackburn, Dean of the Faculty of Medicine in the University of Sydney, and Dr. Isbister of Sydney, Mr. Julian Smith and Mr. Bernard Zwar in Melbourne, had all done credit to the University of Adelaide.

Dr. de Crespigny feared that these remarks might sound a little vainglorious; if so, he hoped he would be forgiven on such an occasion.

He would like to say how glad they were to have among them Dr. Goldsmith, who, with Dr. Hope, Dr. Cromwell Magarey and the late Dr. Alfred Lynch, had been among the first graduates. The first must have been a vintage year.

Now a word about the future. For many years most of the members of the Faculty had felt that there should be more adequate provision for research in medicine and surgery and their allied sciences than at present existed.

During the year 1935, at the Government Laboratory, with the assistance of the University, an able bacteriologist, Dr. Platt, had been appointed; and now, by the retirement (which they all regretted) of Dr. McLoughlin, the position of director became vacant. The University had increased the salary by a contribution from the Sheridan bequest, so that a director might be appointed who would also be a director of medical research within the University. The mass of work done by the laboratory and the clinical work in the hospital would aid him to formulate his problems. This was not all, however. They had long needed a building adequate to house the laboratory and portion of the Department of Pathology, a museum, laboratories for students, and especially adequate accommodation for research workers, with the necessary equipment. They believed that the attainment of their object was in sight. Dr. de Crespigny was most happy to announce that three generous people had each promised the sum of £5,000. Miss Edith Bonython, following the tradition set by her father, who had already so nobly endowed the University, was one. Mr. Barr Smith, whose uncle, Sir Thomas Elder, was the first benefactor and whose father was renowned for his generosity, and who himself had most munificently given to the University, was the second. The third was Mr. Norman Darling. To his family the University was, as Dr. de Crespigny had said, deeply indebted for the Darling Building. He was sure it was with heartfelt appreciation that they acknowledged his gift.

To this sum of £15,000 it was hoped that the Government would add an equal amount, sufficient to fulfil the plan for establishment of an institute of medical science. Such a foundation with an able director and staff would, they believed, be an invaluable development in the school. It should become a centre of clinical research, for it was only from studying the hidden secrets of Nature by observation and experiment that medical science, like all other sciences, might be advanced. Further, with suitable scholarships and endowment funds (and they had reason to hope that such might be forthcoming in the near future) graduates might be encouraged to work in it upon the investigation of the problems of disease. It would be admirably suited, too, for post-graduate study, which was becoming more and more necessary for medical men and women.

A theatre for lectures and demonstrations would be contained within the building. Towards its equipment would be devoted subscriptions to the Verco Memorial Fund, and the theatre would be named after Sir Joseph Verco to the honour of his memory.

The building would stand within the hospital grounds opposite the University, forming, as it were, a connecting link between the two essential parts of the school.

In conclusion, Dr. de Crespigny said that he believed that those present would join with him in the hope and

confidence that, although they had some cause to be satisfied with what had been accomplished in the last fifty years, the next half century might have yet greater progress in store for the medical school in the University of Adelaide.

The health of the visitors was proposed by Sir Henry Newland and Lord Horder, and Dr. R. E. Priestley, Vice-Chancellor of the University of Melbourne, replied. In his reply Dr. Priestley said that he hoped the example of the Adelaide benefactors would be followed in Melbourne.

Naval, Military and Air Force.

THE ROYAL ARMY MEDICAL CORPS.

MAJOR-GENERAL R. M. DOWNES, Director-General of Medical Services, Australian Military Forces, has forwarded for publication the following statement regarding the Royal Army Medical Corps.

The greatest change in recent years in the conditions of service in the Royal Army Medical Corps has been the adoption of a short service system, that is, medical officers now join the corps for a period of five years, and at the end of this time there are two possibilities: retirement with a gratuity of £1,000 or the acceptance of a permanent commission. Some officers will prefer the first alternative and return to civil life with this gratuity, *plus* whatever additional sum they may have saved; in the case of unmarried officers of quiet tastes the latter sum may amount to several hundred pounds. The officers who are required to complete the permanent medical establishment will be selected from those anxious to make the service their permanent career, and naturally the authorities will select the men who have rendered the best service and who have shown themselves most desirable through their professional and general attainments.

The career of a short service commissioned officer is briefly as follows. He attends a two months' course at the Royal Army Medical College, London, where instruction is given in entomology, tropical medicine *et cetera*, followed by one month at the Royal Army Medical Corps Depôt, Aldershot, where he is instructed in drill, army organization, medical arrangements in war, riding and practical sanitation. At the end of this period he normally is posted to one of the large military hospitals at home for duty for a short period and then proceeds on a tour of service abroad. The foreign tour in India, Egypt and the Mediterranean stations is five years, that of the colonies three years, but in the case of those officers retiring on a gratuity after five years' service, arrangements would be made for them to return to England by the end of that period.

The pay and allowances at home stations are shown in detail in regulations for admission to the Royal Army Medical Corps. The rates of pay (in rupees) in India are generally appreciably higher than the corresponding rates for officers serving at home, a lieutenant receiving approximately £48 a month and a captain approximately £60 a month. Pay in the colonies is the same as at home, but the rates of allowances are varied to suit local conditions and, in addition, colonial allowance is given, the amount of which varies with each colony. In order to fit himself out with uniform, a young officer receives a grant of £50.

An old objection to joining the army medical service, and one that dies hard, is an idea that opportunities for professional work are few, and that keenness, except in matters of sport, is not encouraged. Whatever tincture of truth this belief may have had in the past, it is utterly false today. Ample opportunities exist for first class work, and the authorities encourage in every possible way those who wish to better their professional knowledge and standing.

Every young officer who joins the corps is likely to find himself, some time or other, in medical charge of effective troops. Whether this is combined with hospital work or not (and it almost invariably is), there is no job, military or civil, which can be more varied or fascinating, few which provide such opportunities for studying one's fellow men, and none where good honest work can give a more stimulating return.

The wise medical officer proceeds with caution until he is firmly established; then, as time goes on, he finds himself becoming more and more a personality, his advice sought after and followed, until in the end he may attain a position of responsibility and influence far beyond his years and military rank. The sick parade is a liberal education in quickness and judgement, with the added interest of learning later how the provisional diagnosis finally turns out.

Medical officers, both at home and abroad, are centred on the hospitals, each with its quota of special departments—medicine, surgery, pathology, radiology, and so forth—just as in every civil hospital, while in the larger commands there is a special hospital for women and children as well. Every encouragement is given to young officers to be employed in that branch of their profession in which they are specially interested, with a view to their qualifying as specialist in that subject after they have been given a permanent commission.

Correspondence.

A CORRECTION.

SIR: In your issue of October 12, page 497, I notice an inaccuracy which I would like to correct. You refer to "Dr. G. H. Oxer (Western Australia)". It was actually my brother, D. T. Oxer, of the Commonwealth Serum Laboratories, Royal Park, who addressed the meeting, having been invited to do so on account of some work of his own in connexion with the subject under discussion.

Yours, etc.,

Nannup, Western Australia, October 23, 1935. G. M. OXER.

CLINICAL OBSERVATION ON BLOOD PRESSURE.

SIR: I read with great pleasure and appreciation the paper by Dr. R. Southby, in the journal of October 26, on blood pressure. As in many other subjects, so in this one, we are apt to hold too strongly by accepted working hypotheses and forget that they are only partially true.

Dr. Southby enunciates a theory to account for differences between apparent blood pressure readings in left and right arms of the same subject. It seems to me likely that the difference is due really to different resistances in the tissues and vessels against the effects of crushing pressure. Were one to describe to an engineer our method of arriving at the blood pressure he would probably say something to the following effect: "You are estimating the pressure of a mass of fluid moving within a tube by crushing the tube until the current stops. The pressure necessary to accomplish this you regard as the blood pressure. But there is no allowance for the resistance of the walls of the tube against your crushing effort." The objection is quite valid; moreover, we ignore equally the resistance of the surrounding tissues.

One may show, by the following simple experiment, how our manometric readings are affected by elastic resistance of the things that surround the moving mass of blood: (*a*) Estimate apparent blood pressure in the ordinary way. (*b*) Cover the arm which has been used for (*a*) with a band of rubber cut from an old motor tire inner tube. The band must be at least equal in breadth to that of the sphygmo-cuff, and its ends must overlap. (*c*) With the

rubber band in position under the cuff, again take the "blood pressure". The second reading will be higher than the first by a few millimetres. From the results of this simple procedure and a little thinking I have believed for a long while that, in our so-called blood pressure estimations, the manometric readings stand for true blood pressure *plus* resistance of tissues and vessels to crushing pressure. This resistance is largely elastic.

It is interesting to note how Dr. Southby's figures seem to bear out my contention. In Table IV the difference is shown to increase up to fifty years of age and then to fall off irregularly. Strength of muscle, tone of tissues and nervous excitability (see below) increase and fall off during life following roughly the age progression indicated. That varying tonus and growth of tissues is the principal cause of the observed differences is shown also by the fact that, as Dr. Southby again points out, the right reading is nearly always higher than the left. That there are any cases in which the left is higher than the right seems to indicate that Dr. Southby's dynamic theory will not fit the case.

Those subjects displaying an apparent blood pressure higher than normal also tend to give readings of greater difference than normal. This may be accounted for in the following ways: (*a*) Very robust individuals having high muscular development often show a high apparent blood pressure. Usually their muscular tissue development is proportionately greater on the right than the left side; hence proportionately greater resistance to tissue crushing. (*b*) Hyperpiesia and allied conditions are accompanied by a general progressing tissue sclerosis (that is, hardening). This hardening tends to be distributed unevenly. Hence a resistance, additional to the normal tissue resistance, being thus unevenly distributed, may increase the ordinary difference between the two arms.

One other interesting point is the surprising fluctuations of apparent blood pressure one meets with occasionally in young nervous subjects. Variations of many millimetres may occur during a few minutes. Quite possibly this variation is due, not to variations in the true blood pressure, but to the involuntary muscular contractions of nervousness. One need only squeeze one's own biceps between finger and thumb to learn how great can be the difference in compressibility between relaxed and contracted muscle.

Yours, etc.,

WILLIAM P. KELLY, F.R.C.S.I. *et cetera.*

38, Macgregor Terrace,
Paddington,
Brisbane,
October 30, 1935.

FIRE-WALKING: A SIMPLER EXPLANATION.

SIR: My attention having been drawn to the letter of Dr. Arnott by Dr. Fiaschi, perhaps you may care for one from myself, as I have spent half a lifetime amongst Pacific islanders and have witnessed numerous fire-walking exhibitions. So as not to trespass unduly upon your space, I will give one example of what is the effect upon most persons witnessing this extraordinary example of the unreliability of even trained and scientific witnesses at times. The greatest, perhaps, of American photographic experts, De Froud, and myself attended such an exhibition at Mbengga Island, Fiji group, in 1931. We had both photographed similar affairs before; and we agreed, instead of using our cameras, to carefully time and examine the alleged miracle during its performance. When returning to Suva, we asked the other members of the party, including two medical men and a famous Australian politician: "How long were the men upon the hot stones?" The shortest time given was half a minute, and others judged it to be from a minute to two minutes. De Froud's time, taken with a stop-watch, was seven and a half seconds, and mine five seconds.

Speaking to the "historic" blacksmith of Letoka, known to all Fijian inhabitants, he picturesquely declaimed in words not fit for publication that: "Them niggers can fool the blank, blank tourists. Why, they've hoofs of horn, not feet like us! I've caught 'em snavelling my red hot iron many a time; and anyone who has tramped about coral reefs for generations would think nothing of a few seconds on hot coals—an' that's all they are!" I think that we need the spirit of dear old Socrates when approaching a subject like this. To quote a well known writer upon this "first Darwinian": "Fretful and impatient men, swept off their feet by enthusiasm, destroy more than they build." Saint Pierre taught us: "The ignorant observe without reasoning; and the educated reason without observing."

I have spent many years in unearthing the old temples, figure groups, inscriptions and ruins of ancient stone forts and towns that tell of two previous civilizations of the western Pacific. It has been my province at the same time to have wiped out numberless beliefs and romantic tellings, which, like the "boy climbing the rope into disappearance" of the old-time Indian officers' *régime*, have passed into the *Ewigkeit*.

Yours, etc.,

ARTHUR J. VOGAN, F.R.G.S. (England).

58, Cliff Street,
Northwood,
New South Wales, October 25, 1935.

[The attention of readers is directed to a report on Kuda Bux's demonstration, published in *The British Medical Journal* of September 28, 1935, at page 586.—EDITOR.]

Obituary.

JOHNSTONE SIMON THWAITES.

WE regret to announce the death of Dr. Johnstone Simon Thwaites, which occurred on October 30, 1935, at Armadale, Victoria.

Congresses.

THE PAN-PACIFIC SURGICAL ASSOCIATION.

DR. RALPH WORRALL has forwarded a communication from Dr. Forrest J. Pinkerton, Secretary-Treasurer of the Pan-Pacific Surgical Association, who announces that the second conference of the association will be held at Hawaii in August, 1936. The work of the conference will be divided into sections, and particular attention will be paid to surgical research. It is hoped that the meeting will be representative of the surgery of all the countries bordering on the Pacific. Full information may be obtained on application to Dr. Pinkerton at Honolulu, Hawaii.

Proceedings of the Australian Medical Boards.

NEW SOUTH WALES.

THE undermentioned have been registered, pursuant to the provisions of the *Medical Act*, 1912 *and* 1915, of New South Wales, as duly qualified medical practitioners:

Donald, Russell Hughes Oxby, M.B., B.S., 1935 (Univ. Melbourne), St. George District Hospital, Kogarah.

Godfrey, Merle Franklin, L.R.C.P., L.R.C.S., 1934 (Edinburgh), L.R.F.P.S., 1934 (Glasgow), The Sanatarium, Wahroonga.

Heffernan, John Thomas, L., L.M., 1910, R.C.P. (Ireland), L., L.M., 1910, R.C.S. (Ireland), Mansion House Hotel, Sydney.

Newell, John Alexander, M.B., Ch.B., 1891 (New Zealand), 8, South Street, Double Bay.

Stewart, Alan Benjamin, M.B., Ch.B., 1920 (Leeds), Darley Road, Manly.

Diary for the Month.

Nov. 19.—Tasmanian Branch, B.M.A.: Council.
Nov. 19.—New South Wales Branch, B.M.A.: Ethics Committee.
Nov. 20.—Western Australian Branch, B.M.A.: Branch.
Nov. 20.—Victorian Branch, B.M.A.: Clinical Meeting.
Nov. 21.—New South Wales Branch, B.M.A.: Clinical Meeting.
Nov. 22.—Queensland Branch, B.M.A.: Council.
Nov. 23.—Victorian Branch, B.M.A.: Country Branch Meeting (Horsham).
Nov. 26.—New South Wales Branch, B.M.A.: Medical Politics Committee.
Nov. 27.—Victorian Branch, B.M.A.: Council.
Nov. 28.—South Australian Branch, B.M.A.: Branch.
Nov. 28.—New South Wales Branch, B.M.A.: Branch.
Dec. 2.—New South Wales Branch, B.M.A.: Organization and Science Committee.
Dec. 3.—Tasmanian Branch, B.M.A.: Council.
Dec. 3.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
Dec. 4.—Western Australian Branch, B.M.A.: Council.
Dec. 4.—Victorian Branch, B.M.A.: Annual Meeting.
Dec. 5.—South Australian Branch, B.M.A.: Council.

Medical Appointments.

Dr. A. E. Gribble has been appointed Public Vaccinator at Stawell, Victoria.

* * *

Dr. W. Fenwick has been appointed Government Medical Officer at Grenfell, New South Wales.

* * *

Dr. L. S. Loewenthal has been appointed Acting Honorary Director of Radium Department, Prince Henry Hospital, Office of the Director-General of Public Health, New South Wales.

* * *

Dr. H. G. Brown has been appointed, pursuant to the provisions of the *Workers' Compensation Act*, 1928, to be a Certifying Medical Practitioner at Lismore, Victoria.

* * *

Dr. H. R. Pomroy has been appointed Honorary Surgeon in charge of the Orthopædic Department at the Adelaide Hospital, South Australia.

* * *

Dr. L. O. Betts has been appointed Honorary Assistant Surgeon to the Orthopædic Department at the Adelaide Hospital, South Australia.

* * *

Dr. R. W. Chambers has been appointed Chairman of the Nurses' Board of Victoria, under Section 5 (4) of the *Nurses Act*, 1928.

* * *

Dr. W. B. Dight has been appointed Honorary Radiologist at the Prince Henry Hospital, Little Bay, New South Wales, for a period of twelve months.

Medical Appointments Vacant, etc.

For announcements of medical appointments vacant, assistants, *locum tenentes* sought, etc., see "Advertiser", pages xviii, xix. and xx.

BOULIA HOSPITAL, BOULIA, QUEENSLAND: Medical Officer.

CANBERRA COMMUNITY HOSPITAL, FEDERAL CAPITAL TERRITORY: Medical Superintendent.

KALGOORLIE DISTRICT HOSPITAL, KALGOORLIE, WESTERN AUSTRALIA: Resident Medical Officer.

LAUNCESTON PUBLIC HOSPITAL, LAUNCESTON, TASMANIA: Resident Medical Officer.

NEWCASTLE HOSPITAL, NEWCASTLE, NEW SOUTH WALES: Medical Registrar.

PERTH HOSPITAL, PERTH, WESTERN AUSTRALIA: Resident Pathologist and Biochemist.

SYDNEY HOSPITAL, SYDNEY, NEW SOUTH WALES: Honorary Officers.

Medical Appointments: Important Notice.

MEDICAL practitioners are requested not to apply for any appointment referred to in the following table without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

BRANCH.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 135, Macquarie Street, Sydney.	Australian Natives' Association. Ashfield and District United Friendly Societies' Dispensary. Balmain United Friendly Societies' Dispensary. Friendly Society Lodges at Casino. Leichhardt and Petersham United Friendly Societies' Dispensary. Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney. North Sydney Friendly Societies' Dispensary Limited. People's Prudential Assurance Company Limited. Phœnix Mutual Provident Society.
VICTORIAN: Honorary Secretary, Medical Society Hall, East Melbourne.	All Institutes or Medical Dispensaries. Australian Prudential Association, Proprietary, Limited. Mutual National Provident Club. National Provident Association. Hospital or other appointments outside Victoria.
QUEENSLAND: Honorary Secretary, B.M.A. Building, Adelaide Street, Brisbane.	Brisbane Associate Friendly Societies' Medical Institute. Chillagoe Hospital. Members accepting LODGE appointment and those desiring to accept appointments to any COUNTRY HOSPITAL, are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.
SOUTH AUSTRALIAN: Secretary, 207, North Terrace, Adelaide.	All Lodge appointments in South Australia. All Contract Practice Appointments in South Australia.
WESTERN AUSTRALIAN: Honorary Secretary, 205, Saint George's Terrace, Perth.	All Contract Practice Appointments in Western Australia.
NEW ZEALAND (Wellington Division): Honorary Secretary, Wellington.	Friendly Society Lodges, Wellington, New Zealand.

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